FLIGHT, DECEMBER 22, 1938 FIRST AERO WEEKLY IN THE WORLD

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No. 1565
Vol. XXXIV

FLIGHT 6D

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FLIGHT

The AIRCRAFT ENGINEER AND AIRSHIPS

FIRST AERONAUTICAL WEEKLY IN THE WORLD : FOUNDED 1909

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Editorial, Advertising and Publishing Offices: DORSET HOUSE, STAMFORD STREET, LONDON, S.E.1

Telegrams: Truditur, Sedist, London. Telephone: Waterloo 3333 (50 lines).

8-10, CORPORATION ST., COVENTRY. Telegrams: Autocar, Coventry. Telephone: Coventry 5210.

GUILDHALL BUILDINGS, NAVIGATION ST., BIRMINGHAM, 2. Telegrams: Autopress, Birmingham. Telephone: Midland 2971.

260, DEANSGATE, MANCHESTER, 3. Telegrams: Iliffe, Manchester. Telephone: Blackfriars, 4412.

26B, RENFIELD ST., GLASGOW, C.2. Telegrams: Iliffe, Glasgow. Telephone: Central 4857.

SUBSCRIPTION RATES: Home and Canada: Year, £1 13 0. 6 months, 16s. 6d. 3 months, 8s. 6d. Other Countries: Year, £1 10 0. 6 months, 18s. 6d. 3 months, 9s. 0d.

No. 1565. Vol. XXXIV. DECEMBER 22, 1938. Thursdays, Price 6d.

The Outlook

Forewarned

VERY shortly the Royal Air Force will be taking delivery of their first batch of Lockheed Fourteens, two hundred of which have been ordered by the Air Ministry.

At this moment it ought to be understood straight away that, while the Fourteen is a magnificent technical achievement, it is not without fault, though if the machine's characteristics are thoroughly understood there appear to be no particular difficulties. Pilots both here and in America have proved that the machine can do a good job of work, but it is essential that all those pilots who are going to fly these R.A.F. Fourteens should be thoroughly trained both in the somewhat new technique of the operation of the Fowler flaps, and in the handling of the type—particularly during a take-off with a full load.

We suggest that a special training section should be set up at, say, Martlesham Heath, for the purpose. There the test pilots who have become thoroughly acquainted with the first machines to be delivered may afterwards give, say, a fortnight's intensive instruction to all the Service pilots who will fly the type.

Apart from two well-understood accidents to earlier Fourteens in America, there have since been others which appear to have been due to loss of control at or near the stall. In the first of these, which occurred during a night take-off, the facts were thoroughly explained, as usual, by the U.S. Bureau of Air Commerce. The machine had just left the ground when the port wing dropped suddenly and could not be brought up again before it touched the ground.

In another accident, which occurred at Schiphol airport, Amsterdam, on December 9, the circumstances appear to have been similar. Almost immediately after the take-off the port wing dropped and the machine, according to reports, sideslipped into the ground.

We repeat that, with a real understanding of the difficulties which may at present be inseparable from such a high-performance type, these difficulties can be understood and overcome. It is only necessary to make sure that they *are* understood. The dangers are not those peculiar only to the Fourteen, but, in greater or lesser degree, to nearly all highly loaded types constructed to the modern formula.

New Status for Air Observers

THE Air Council have announced a considerable reform in putting air observers on the same footing as airmen pilots in both pay and status. It is now possible for a young man of from 17½ to 25 to enlist as a direct-entry air observer, and, so soon as he is trained, to earn about £300 per annum for carrying out duties which will certainly appeal to him, while at the same time wearing on his sleeve the coveted three chevrons of a sergeant. He will enjoy all the advantages of the sergeants' mess and will be treated by aircraftmen with the respect due to a senior non-commissioned officer. It is a most alluring prospect, and the call for 1,500 direct-entry air observers is sure to be met by many times that number of applications. Details of the scheme are given on page 584 of this issue. We only hope that senior corporals in the various R.A.F. trades will not feel any soreness at the appearance of these highly favoured youths; but it must be remembered that the work of an air observer is responsible and exacting, and that those who qualify for the post will have undergone a stiff course of training in navigation, bomb-aiming, aerial photography, general reconnaissance, as well as acquiring an adequate knowledge of gunnery and wireless telegraphy. In any case, the direct entry of air observers is only a temporary expedient. Later on they will be chosen from among serving airmen.

THE OUTLOOK (CONTINUED)

Bomber Crews

AT the same time another useful reform is being made inside the Bomber Command in respect of air crews. The ordinary crew of a three-seater bomber consists of pilot, observer or wireless operator, and air gunner. In the past the gunners have been drawn mostly from the trades of wireless operator, armourer and photographer, and when not in the air have had to do the ground work of their trade. Henceforth they will be drawn only from the wireless operator class, and after a month's gunnery course they will be confined solely to crew duties, and will have no ground work to do in their trade. As a result, in a bomber's crew of three, the wireless operator and the air gunner will be interchangeable, which will be an obvious advantage. Change of occupation may relieve fatigue on a long flight, and if one should be wounded in a fight, the other will be capable of carrying on with both duties. After three years of such work, a proportion of what are now to be called "wireless operators (air crew)" will be selected for training as air observers, with all the advantages mentioned above.

As all airmen want to get into the air as much as possible, there may perhaps be some regrets from armourers and photographers that they are no longer eligible for the post of air gunner; but the team work in bombers ought to be improved by the permanent position now given to the crews.

New Fighter Strength

THE first steps taken to increase the country's strength in fighter squadrons has been the conversion of five squadrons of the Auxiliary Air Force into fighter squadrons and the raising of one new fighter squadron in that force. As a result, No. 11 (Fighter) Group, which is responsible for the defence of London, has been increased in strength from nineteen to twenty-one squadrons by the conversion of Nos. 501 (County of Gloucester) and 615 (County of Surrey)—the latter was previously an army co-operation unit—while No. 12 (Fighter) Group, which protects the Midlands and North now has sixteen squadrons instead of its previous strength of twelve. The additions to No. 12 Group are Nos. 504 (County of Nottingham), 603 (City of Edinburgh), 609 (West Riding), and 616 (South Yorkshire). Of these No. 616 is a new formation, stationed at Doncaster, while the other three were previously bomber squadrons.

Both divisions of the country will feel all the safer for this increase in the strength of their defenders, and there are obvious reasons why the Auxiliary Air Force should specialise on defence. Though the counter-attack is likewise a guarantee of the country's safety, still these A.A.F. pilots will feel it their particular and proper function to fight for their own cities. They will also have the advantage of familiarity with their districts.

Other A.A.F. Changes

AT the same time three Auxiliary squadrons which are stationed near the coast have been turned into general reconnaissance squadrons—a new departure for citizen airmen. These are Nos. 500 (County of Kent), 502 (Ulster), and 612 (County of Aberdeen), of which the first two were previously bomber units, while the Aberdeen squadron was an army co-operation squadron.

Thus of the three A.A.F. squadrons which were previously devoted to work with the Territorial Army, two have been lost to that Army. As partial compensation, No. 602 (City of Glasgow) has been converted from a bomber squadron into an army co-operation squadron, and so the Territorial divisions of Scotland neither gain nor lose by the deal. They will doubtless find it more useful to have their one air squadron stationed at Glasgow rather than at Aberdeen.

The Bomber Command is the real loser by these changes, as it is now poorer by seven A.A.F. squadrons (500, 501, 502, 504, 602, 603, 609). It remains to be seen whether the strength of this most important Command will be made up by raising new regular squadrons, by increasing the establishment of existing squadrons, or by a combination of these two methods. That its strength will be made up, and also increased, there is no manner of doubt.

Change of Front in America

YEARS ago a number of people who should have known better pointed to the American radio-beacon system as the ideal in advanced navigational aids for transport pilots. Little by little the confidence in these beacons has been shaken. Every year a very large proportion of the airline accidents in the United States are shown to have been due to navigational errors on the part of the pilots, and these errors have usually been caused through mistaking a particular beam track or through actually losing a beam.

The whole trouble with the American system is that, once the pilot has got off his correct track, it is practically impossible for him to discover his position, and he is forced to come down to look—a dangerous procedure. Needless to say, American air transport machines carry two-way radio worked on telephony, and cases have been known when the pilot has told his terminal that he is uncertain of his position, and this terminal has broadcast a message over a large area asking police and other persons to listen for the sound of the machine and to report its whereabouts.

At long last the authorities in the United States are beginning to realise that the European system of direction-finding has its advantages. The Civil Aeronautics Authority has ordered three Adcock D/F stations for installation at Newark, Pittsburgh and Washington. If these prove to be satisfactory and useful, the system will be extended for use in conjunction with the present network of beacons and new ultra-short-wave transmitters which are now being installed. In the end, if the scheme is carried through, there is no doubt that the transport pilots in America will have a finer system of radio guidance than is available anywhere else, but in the meantime there is a rapidly growing feeling that all is not well with the system as it stands.

In this country we learn of only those navigational errors which cause loss of life through the destruction of a particular machine, but, if rumours are to be believed, quite a few "lost" machines are actually put down without serious damage in the course of every month.

DIARY OF FORTHCOMING EVENTS—PAGE 587

"Mercury," in "Maia's" arms, being loaded with Christmas mails.

To readers at Home, in the Empire and in Foreign Countries, the Editor and Staff of "Flight" extend Christmas Greetings and Wishes for a Prosperous New Year, reciprocating the many kind wishes already received by Air, Land and Sea.

UNORTHODOX TRANSPORT

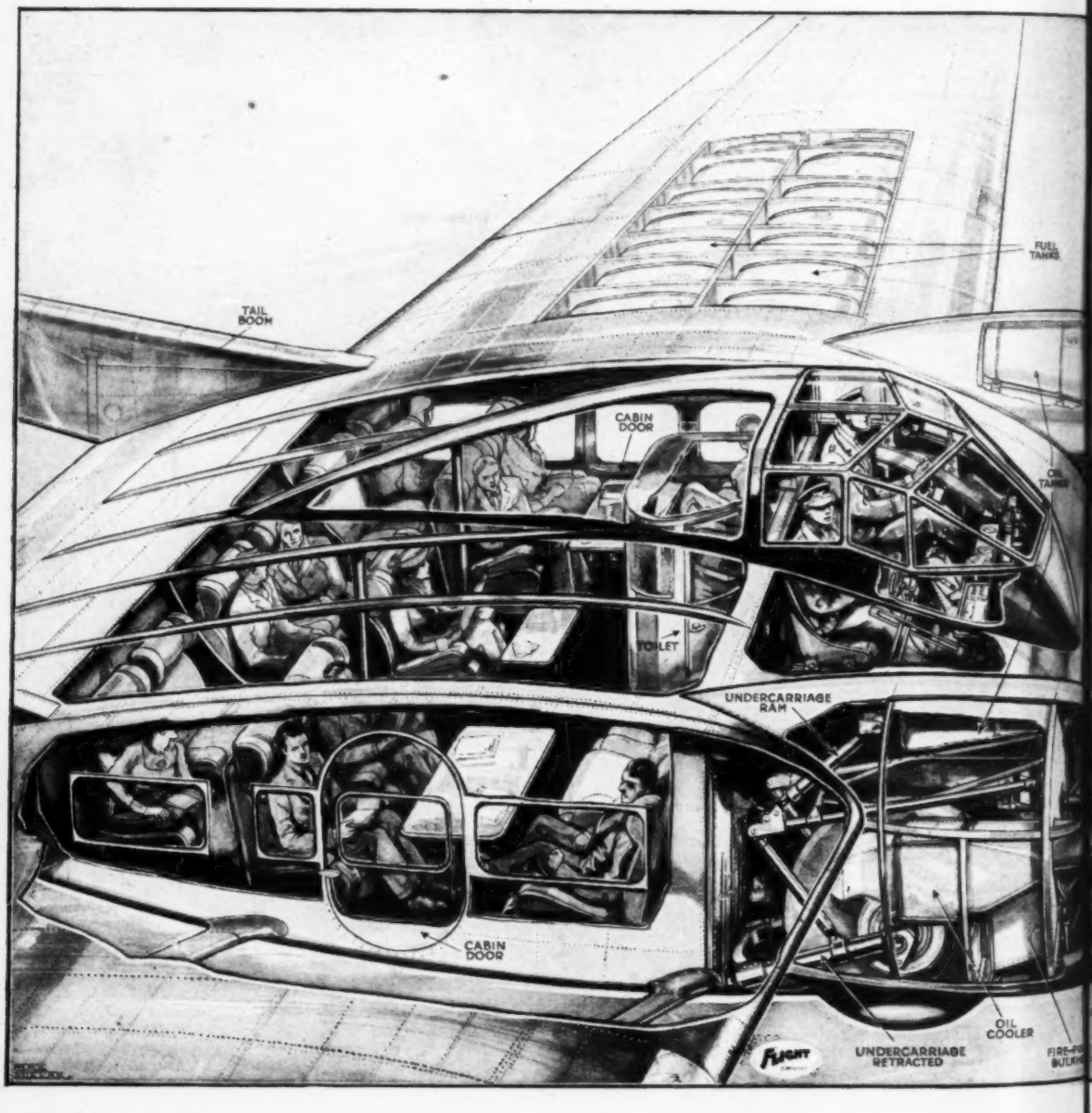
The New Cunliffe-Owen Flying Wing : Accommodation for 15-20 Passengers : Perseus Sleeve-valve Engines

THE claims for the basic lifting fuselage scheme have been set out so frequently as to warrant only the briefest résumé. They include cabin spaciousness, safety in emergency landings, and ease of operation with one engine cut out. The latest development of the theme is the machine now almost ready for flight trials at the Southampton works of Cunliffe-Owen Aircraft, Ltd., where Mr. Cooper is chief draughtsman, with Mr. Fisher supervising design technicalities.

The name "Flying Wing" has been adopted for the machine, although there is a more or less conventional tail carried on two boom members. The new aircraft is externally reminiscent of the American U.B.14, which has been used for experimental work, but the structure has been entirely redesigned.

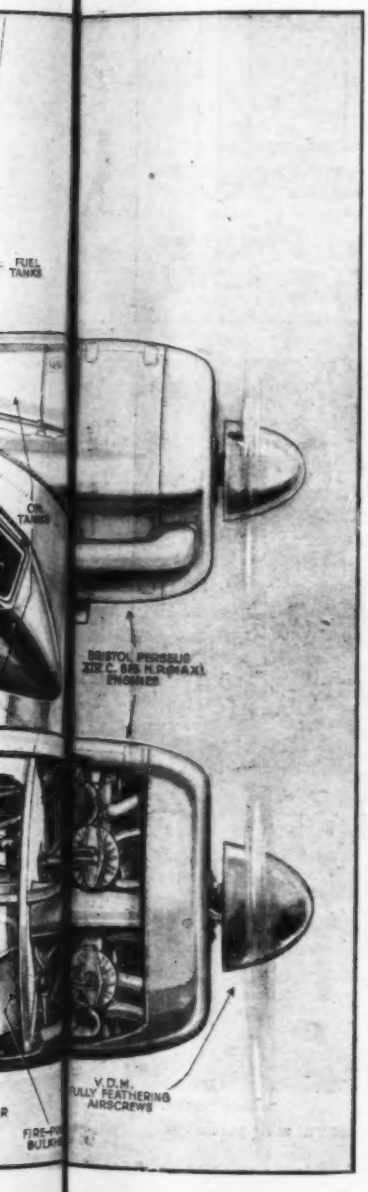
Outer wing panels, strut-braced to the centre-wing portion, are of two-spar construction with smooth duralumin sheet covering. Duralumin extrusions of T section are used for the spar booms, the vertical webs being of solid sheet with vertical stiffeners. Normally the main ribs (which extend only between the spars so that a torsion box is formed by the front spar, top skin, rear spar and bottom skin) have deep channel-section booms and girder-type bracing members of channel section.

There are three special ribs, including that at the root, which are of the plate type.



"Flight" photograph.

This three-quarter rear view of the new Cunliffe-Owen transport shows the shape of the tail booms.



The general layout and accommodation of the new Cunliffe - Owen may be visualised from this specially prepared *Flight* drawing. The installation of the Bristol Perseus sleeve-valve engines is also evident.

In addition to these three special ribs are four "tank" ribs of different design. These four ribs follow the shape of the upper portion of the tanks, the latter being suspended by straps. Tank loads are taken mainly by a dummy spar (similar in construction to the main spars) running the length of the tank bay. Stress-carrying tank doors, secured by a considerable number of Simmonds lock-nuts, are located in the bottom skin of the outer wing panels. The wing tips are easily detachable. Nose ribs are of the flat plate type with diagonal channel section stiffeners.

The slotted ailerons are of high-aspect ratio, and are split to prevent hinge binding. They are fully mass-balanced, and an attempt has been made in their design to overcome yawing tendencies by providing a "digging-in" effect for the nose of the raised aileron. The aileron spars have booms of folded channel section, and their trailing edges are of wrapped sheeting.

Split hydraulically operated flaps are fitted between the central wing section, or fuselage, and the ailerons on each side, and there is a third flap beneath the centre section. The outer flaps can be operated independently of the centre-section flap through a Dowty pre-selector valve system in conjunction with Arens push-pull controls. On the U.B.14 it was found that a fuselage flap of the type employed gave a remarkable improvement in the maximum lift coefficient.

The centre wing portion, which houses the passengers, was passed by the N.A.C.A. as providing 20 per cent. of the total lift. This figure has been accepted by Farnborough and stress analysis has been made accordingly.

In the wind tunnel of the New York University it was discovered that the proportions of the lift provided by the outer wings and the centre wing varies with incidence. At high angles the greater part is derived from the outer sections, the lift piling up towards the centre as the incidence is reduced. Under maximum speed conditions it is claimed that approximately 90 per cent. of the lift is provided by the centre portion. This characteristic, in conjunction with the space available in the centre wing portion, suggests possibilities with retractable outer wing panels.

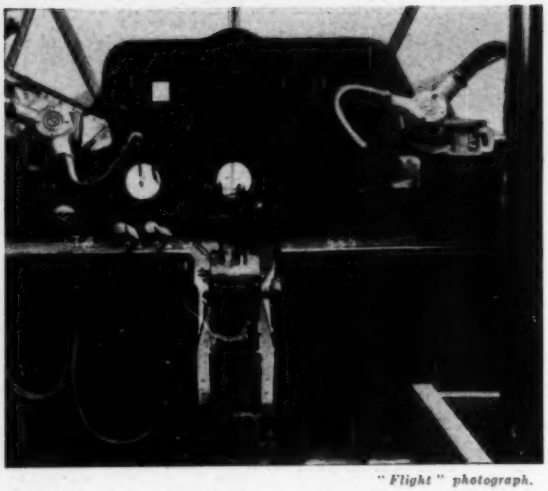
The Central Wing

The central wing portion has four main transverse bulkheads. Number 1, in the plane of the front spar, has extruded duralumin boundary members of T section, a flat plate web, and vertical and horizontal stiffeners. There is a door giving access to the pilot's compartment. No. 2 bulkhead incorporates two equally spaced pillars of Accles and Pollock square-section tubing. The third is a plate-type bulkhead similar to number one, but of rather lighter construction. This bulkhead incorporates a door giving access to the retractable tail wheel. Numbers 2 and 3 bulkheads are connected by specially shaped fore and aft shear panels, permitting ease of movement in the passenger cabin. The fourth bulkhead, also of the plate type, slopes forward. This has extruded booms, a plate web and stiffeners, and is designed to carry the tail wheel loads.

Flat plate side panels of the centre wing portion are of aerofoil section and have heavy angle extrusion boundary members. A door is fitted on each side between bulkheads numbers 1 and 2. The sides are divided into a number of small panels by vertical and horizontal stiffeners. The roof sheeting has transverse stiffeners of rolled "top-hat" section. Externally there are fore and aft roof "skids"; these are heavy dural extrusions of inverted T section, and run from bulkhead number 1 to number 4, transferring the air loads to the bulkheads. There are two Rhodoid panels in the roof which act as emergency exits and provide additional lighting.

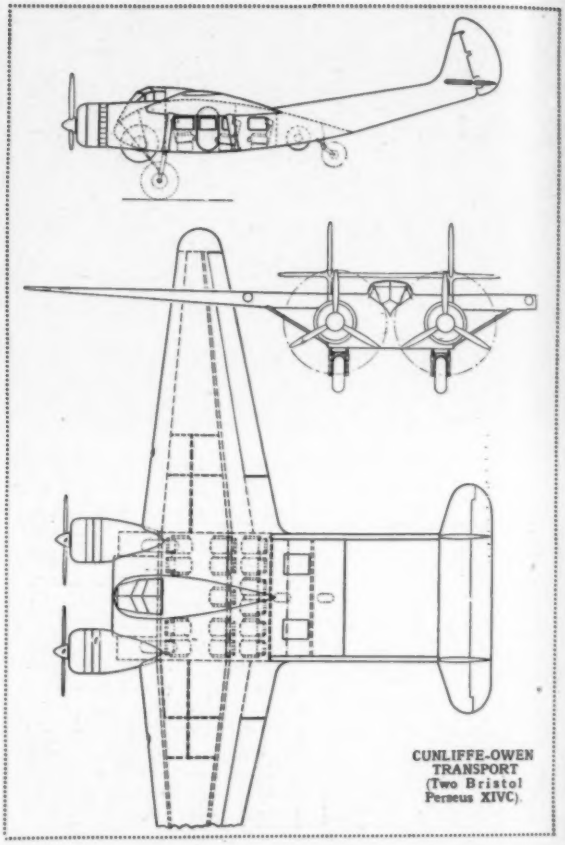
The floor takes the form of transverse corrugations attached inside the skin and carrying sheets of $\frac{3}{16}$ plywood. "Skids," similar to those on the roof, are bolted to the bulkheads.

Twin tail booms are formed of duralumin D sections with flat sides incorporating vertical stiffeners. These house the control cables and are fitted with the appropriate inspection holes. The rear sections are tilted up at a fairly sharp angle, though top fairings give the impression of greater depth and less angularity.



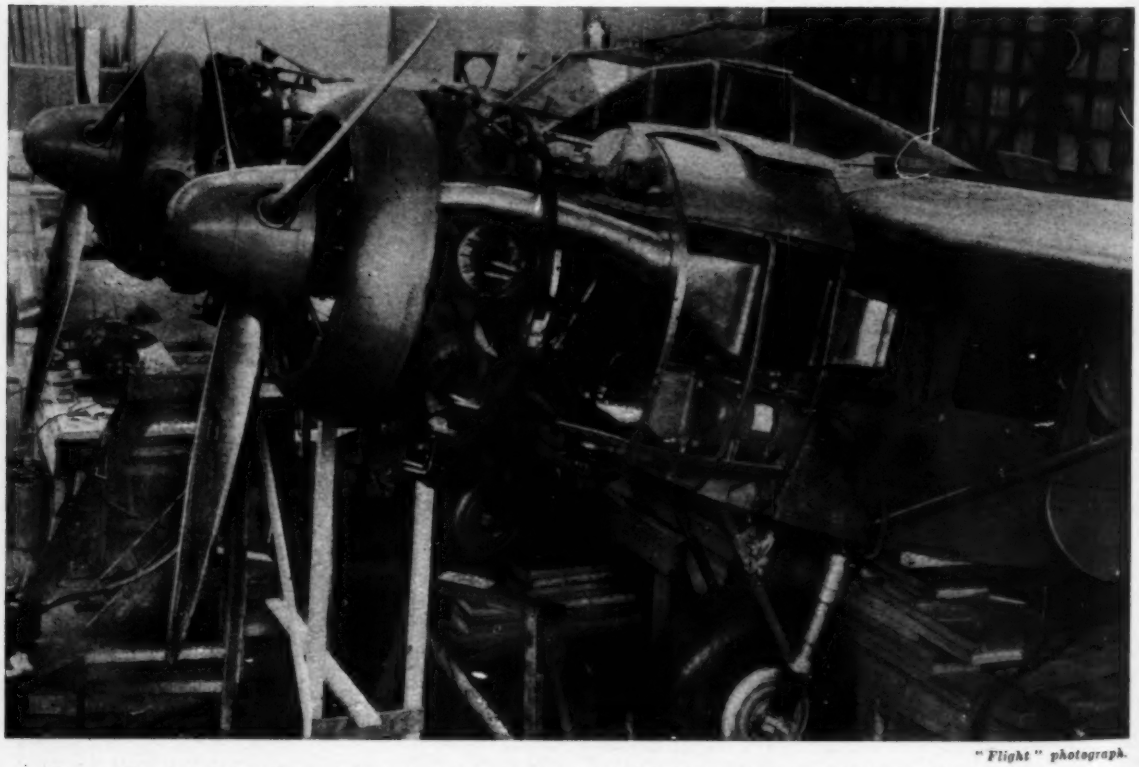
"*Flight*" *photograph.*

The cockpit (in a not-quite completed state), showing the way in which the controls are taken from the sides instead of the floor.



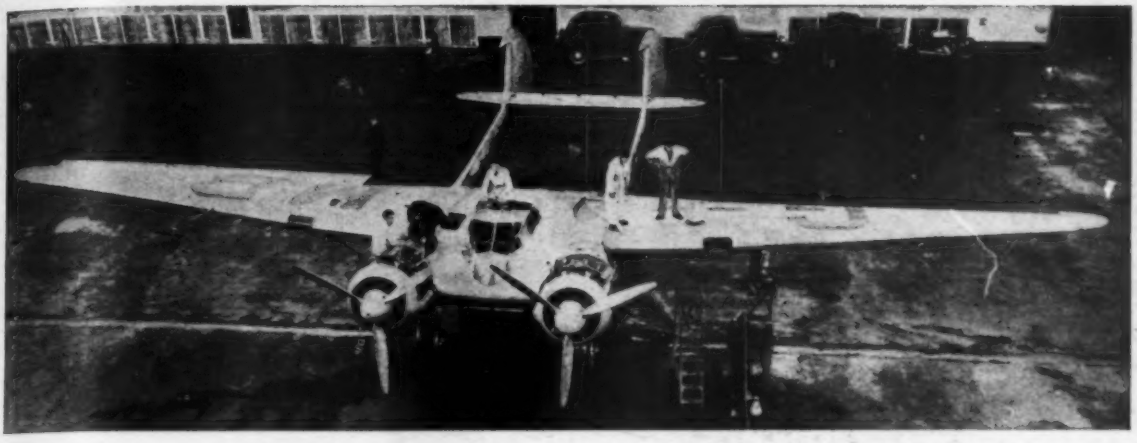
CUNLIFFE-OWEN TRANSPORT (Two Bristol Perseus XIVC).

The retractable tail wheel is of special Dowty design and is carried in a sturdy Hiduminium casting. The arms of the fork are arranged to swing on what are virtually stub axles in such a way that vertical movement of the wheel causes the axle attachment points to splay outward, their movement being resisted by a transverse spring in the axle of the wheel. The tail wheel is of the fully castoring, self-centring type, but provision is made for a castor-locking device remotely controlled by Arens push-pull controls. Take-offs and landings will be made with the wheel locked against castoring, the lock being released only for taxying. The main wheels (Dunlops with differential pneumatic brakes) retract forward into the engine nacelles. Each has



"*Flight*" *photograph.*

The nacelles of the Bristol Perseus XIVC sleeve-valve engines are located at the front corners of the central wing portion or fuselage.



This view, secured on the occasion of the new transport's first "airing," gives an idea of the proportions and size.

two shock absorber legs with inter-connecting balance pipes. The axles are square at their ends, and it is arranged that the wheels can be quickly removed by releasing two studs. A lost motion scheme ensures that the first half-inch of the retracting motion unlocks the undercarriage at the radius rod knuckles. Retraction is normally by an engine-driven Dowty pump, but there is a Dowty hand pump for emergency use in addition to an air-release system designed to blow down all the jacks. Should these three methods fail it is possible to lower the wheels manually.

The cabin will seat twenty in comfort, though the first machine has fifteen super-luxury seats by Rumbold, the layout being shown in the drawing on page 572. The cabin is to be fully soundproofed and luxuriously furnished.

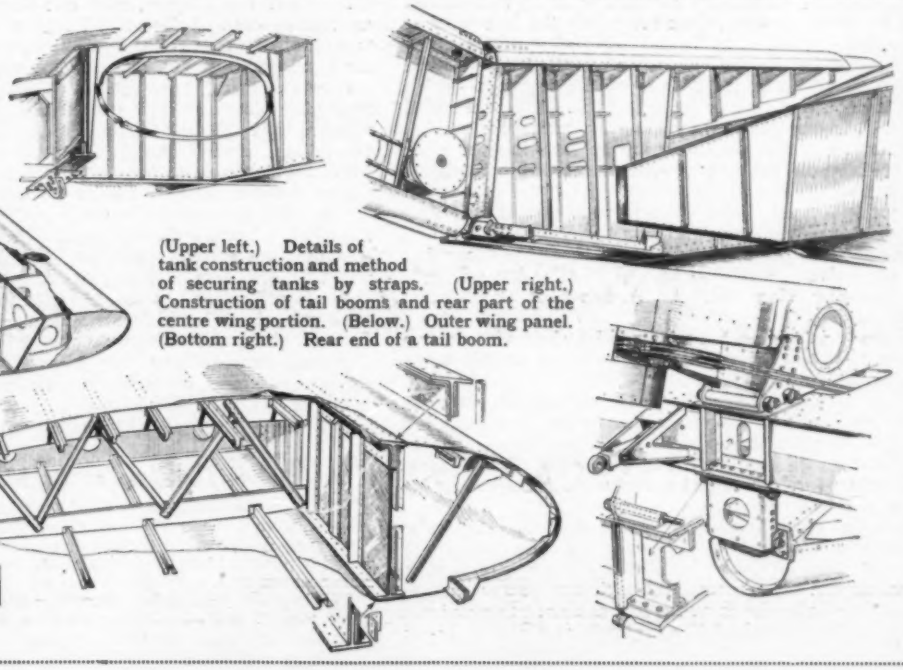
The engines, mounted in nacelles at the forward corners of the centre wing portion, are Bristol Perseus XIVC nine-cylinder sleeve-valve radials, rated at 710 h.p. at 4,000ft. and giving a maximum output of 815 h.p. at 6,000ft. The take-off output is 900 h.p. The cowlings are of the standard Bristol long-chord type, with controllable gills and a single outlet from the nose-type exhaust ring, the tail pipes passing through the central wing portion so that only their ends protrude in the air stream. Airscrews are of the V.D.M. electrically controlled fully feathering three-bladed type and have a diameter of 10ft. 6in. There are two types of pitch indicator, the first being mechanically driven and mounted on the nacelle; the second is on the dashboard.

Petrol is carried in eight wing tanks, two of 54 gallons capacity; two of 67; two of 100; and two of 104. The oil system incorporates Robertson coolers.

Growing out of the top of the centre wing portion at its forward end is the pilot's cockpit enclosure with its long tail fairing. The cockpit has an impressive array of Kollsman (K.B.B.) instruments and the usual Sperry and Reid and Sigrist blind-flying equipment. Other features are the Hobson automatic carburettor controls and a unique tab control box in the roof, each knurled knob turning in the appropriate plane. The dual controls have been designed according to a patented system which makes for unobstructed leg room, the controls being taken from the sides rather than the floor.

Data are: Span, 73ft. 6in.; length, 44ft.; wing area, 826.5 sq. ft.; tare weight, 9,500 lb.; disposable load, 9,500 lb.; top speed at sea-level, 225 m.p.h.; top speed at 6,000ft., 235 m.p.h.; stalling speed, 67 m.p.h.; service ceiling, 20,000ft.; maximum range, 1,950 miles (still air).

STRUCTURAL FEATURES OF THE CUNLIFFE-OWEN TRANSPORT.



(Upper left.) Details of tank construction and method of securing tanks by straps. (Upper right.) Construction of tail booms and rear part of the centre wing portion. (Below.) Outer wing panel. (Bottom right.) Rear end of a tail boom.

THE WEEK AT CROYDON

"A. Viator" Writes of the Future, an A.R.P. Accident and an Admiralty Bombshell—and Discusses, with Unseasonable Scepticism, a New Flying Machine

SOMEBODY very knowledgeable in transport matters (other than air), a very big man in fact, confessed that the air lines ultimately had other forms of transport beaten because it was obvious that commercial flying would eventually solve the problem of fog landings.

Road, rail and sea, he said, would never beat fog because they were in it all the time, whereas in air transport only the landing problem remained to be solved.

During last Thursday's fog a really good use was found for our derelict, comparatively waterlogged, and rapidly crumbling trench system at Croydon. They are, of course, meant for taking cover very quickly when a gas or other attack is heralded. The fact that gas creeps into such places, and stays there, does not matter to the authorities, whose Berkeley Square cellars are surely the last word in gas-proofing.

Anyway, a freight van lost its way in the fog and dived neatly into the entrance of one of the trenches—which might have been specially built to fit it. The van ended up exactly central in the trench, with scarcely a scratch on either wing, the projecting mirror touching the wall. More curious still, the roof of the van was within an eighth of an inch of the roof of the trench. What the driver said as he took the plunge probably sounded worse than it was, owing to echoes and reverberations.

Works and Bricks will be delighted that someone, other than themselves, has fallen into a pit they have digged. Heil Works! Viva Bricks! A fine spot of Yuletide shikari.

Somebody is said to have invented a shell with an eye in its nose which, when it sees an aeroplane, promptly explodes.

This is no new thing. Scattered strategically all over the English part of the air routes to the Continent are a number of prohibited areas and danger areas. Whenever the eye of the officer commanding one of these areas lights on a poor commercial aeroplane anywhere near his area he explodes, too.

Talking of explosions, what fun for the Admiralty to be able to put a spoke in civil aviation's wheel over the Langstone harbour business. What is so lovely is that the Admiralty, bless them, sent a courier to Portsmouth to stop the whole scheme at the last minute. Can you not see him setting out in full canonicals and sword, in an admiral's gig drawn by eight sea horses, with bo'suns piping like so many bullfinches all along the Portsmouth Road? A gangway having been rigged at the Town Hall, Pompey, the courier would introduce himself in dumb show to the Lord Mayor by means of a sailor's hornpipe and then torpedo the carefully laid scheme with considerable gusto.

Lightweight air mail stationery is no new thing, but a big London store has gone one better than this. After considerable experiment (which even included, they say, analysing the weights of various inks) a catalogue of sixty-four pages, no less, was evolved, which, complete with envelope, weighs under half an ounce. Some five thousand have been printed and distributed by air mail throughout the Empire, and one hopes this up-to-date method of doing business will reap a rich reward. One wonders if the firm called in a humorous writer to produce the catalogue in lighter vein so as to save weight?

One visualises, too, such a catalogue (placed on a managing director's desk one Monday morning) being so ethereal that the hot air he talks to his staff sends it to the ceiling, where it remains, missing an air mail or two, until the cooling influence of the typist, with a cup of coffee, reduces the temperature to normal.

"Behind the guarded doors," says a newspaper correspondent, "of a factory near London, international scientists are secretly perfecting a flying machine which will take the man in the street from door to door with the ease and safety of a car, but with four times the speed. It could take a business man from his office in London [using a grass-sown window box as an airdrome, no doubt] to a conference in Paris [vive Fifi et Montmartre] in sixty minutes. Almost the only orthodox part of the machine is the joystick." Which leads one to imagine that it is also the only part perfected—up to date.

Mishap at Darwin

ONE of the inevitable risks to which flying boats, as such, are occasionally exposed was demonstrated at Darwin on December 12, when the Qantas boat *Coorong* broke from her moorings and was badly damaged on the rocks in an eighty-mile-an-hour gale.

The machine had arrived that day from Koepang and the three tons of mail were taken off at considerable risk to the crew before being transferred to *Corinna* which was sent from Sydney to pick them up and continue their journey.

Trouble at Renfrew

AMONG the many aerodromes which have been suffering recently from the effects of heavy rains is Renfrew. During several recent weeks Scottish Airways have been compelled to operate their services from the R.A.F. aerodrome at Abbotsinch, and more recently have been forced to cancel their Campbeltown-Islay service, where, too, the aerodromes have been badly flooded.

Estonian Extension

THE Estonian Government has recently introduced a new Bill by which a national joint stock company is to be founded with the idea of operating airlines both inside and outside the country. The company will receive an annual subsidy of 200,000 kr., and it is proposed to start external services with a Junkers Ju.52 and a "six-seater twin-engined type" (presumably a D.H. Rapide), which will be first used on a new service between Tallinn, Helsinki and Stockholm. The company will be called *Eesti Lonnuselts*.

Surveying the Pacific

IMPERIAL AIRWAYS is now showing real interest in the Pacific. Mr. R. A. Wimbush, of the technical staff, has been sent to Australia, New Zealand and the neighbouring Pacific islands to survey possible flying-boat bases with echo-sounding apparatus.

Mr. Wimbush, who, at the time of writing, was in Auckland, the New Zealand terminal of the trans-Tasman flying-boat service—which, next Easter, will be operated jointly by Imperial Airways, Qantas Empire Airways and Union Airways of New Zealand—plans afterwards to visit the Fiji Islands. He will not survey the lagoon at Lord Howe Island, which has already been surveyed in readiness for the trans-Tasman service. A radio station will be put up there.

The mission comes somewhat belatedly, for the Japanese and Americans have already established themselves in the Pacific. The radio, weather and general ground organisation staffs of Pan-American Airways have been active in the South Pacific for three years, while Japan is planning to run an airline down towards New Guinea by way of her mandated islands. She has already attempted a Pacific survey flight in a Douglas flying boat, but it ended in disaster at about the same time as the *Hawaiian Clipper* disappeared near Manila.

The London-Lisbon Service

IN a White Paper (Cmd.5898), issued last week, the agreement between the Air Ministry and British Airways for the operation of a regular mail and passenger service between London and Lisbon was explained. This agreement is for a period of one year from January 2, 1939 (subject to certain developments) and Lockheed Fourteens are to be used. The service will be covered non-stop between the two points, with one run in each direction every weekday. The company will be expected to carry all the first-class mail between this country and Portugal, though arrangements to this end will be embodied in a separate agreement between British Airways and the Post Office.

The maximum subsidy of £116,000 a year will be reduced by the full amount which the company will receive for mail carriage ; by half any amount by which the operating expenditure falls below the estimate on which the full subsidy has been based and by half the amount by which the net revenue, excluding that for mails, exceeds a similar estimate. On the other hand, any excess over this expenditure, or a deficiency in net revenue, will be borne by British Airways.

It is explained in the White Paper that British Airways have already carried out services on both sides of the South Atlantic in connection with the development of a service to South America via West Africa. British Airways expect to make the first experimental flight through from Lisbon to Bathurst, Gambia, on December 28, while the first unsurcharged mail service to Lisbon will leave Heston on January 2.

K.L.M.'s New Fleet

FOR some time it had been rumoured that K.L.M. intended to purchase a fleet of D.C.4s for use on their Far Eastern and other long-distance services, and six weeks ago the Assistant General Manager of the company, Mr. Hans Martin, made a statement on the subject in Australia. He said that eleven Douglas D.C.4s would be purchased provided that the prototype tests were entirely satisfactory. It was hoped that when and if these machines go into service the London-Batavia section of the K.L.M. Australia service would, by night flying, be covered in 2½ days, and that K.N.I.L.M. would thereafter proportionately reduce the flying time to Sydney.

Now it appears (if rumours are to be believed) that K.L.M. have turned down the Douglas. Presumably the company is therefore in the market for a new type.

Imperial Changes

IT was to be expected, particularly in view of the merger arrangements which will be put in hand next year, that a good many minor changes would occur in Imperial Airways.

One of the first changes was made last week when the technical general manager's department was divided into three sections, which will be separately responsible for development, maintenance and operational control. Previously, Major R. H. Mayo was directly responsible for all three, but in future he will concentrate entirely on the design, research and development department. The separated maintenance and service section will be in charge of Capt. F. R. Walker. No appointment has yet been made for the operations side, though it seems possible that the chief engineer of the company, Mr. H. Hall, may take charge.

The importance of Major Mayo's separated department for research and development cannot nowadays be overestimated, and the new arrangement should make for greater all-round efficiency.

The Langstone Affair

WHEN the Portsmouth City Council met last Thursday afternoon to discuss the offer made by a syndicate for the establishment of an air base at Langstone as a private enterprise, quite a new difficulty cropped up. The Council received a letter from the Admiralty stating that "so far as can be foreseen, any scheme for utilising Langstone Harbour for an air base must be incompatible with the maintenance of essential naval services in the Portsmouth area."

The Admiralty explained that even when the scheme was originally suggested they saw grave difficulties, but were anxious not to do anything to hinder the development of Imperial communications, and were therefore prepared to acquiesce in principle. At the time they thought that it would be even possible to provide alternative accommodation for certain naval activities which could not exist side-by-side with the air base. It had not been found possible, however, to discover, in the meantime, any suitable alternative sites. Only now that the Langstone Harbour scheme was being reconsidered did the Admiralty give this warning.

It will be remembered that since difficulties were experienced in coming to an understanding over the original scheme, by which the Langstone base would be largely provided by the Portsmouth Corporation as a municipal undertaking, a syndicate has offered to take over the responsibility and to establish an airport. The Docks and Airport Committee recommended the Council to adopt the scheme and the finance committee offered no objections. In closing the debate last Thursday, the chairman of the Docks and Airport Committee, Councillor A. Johnson, explained that Imperial Airways had always preferred Langstone and that in 1936 the Air Ministry had condemned Southampton Water. Ignoring for the moment the Admiralty's objection, the Council approved in principle the offer made by the syndicate.

It is rumoured, incidentally, that Pembroke Dock is being considered as an alternative to Southampton Water.

OVERLAND ROUTE : The terminal building at the new Tal Qali aerodrome, near Musta in Malta, which will be used by Imperial Airways for their landplane services to India. The first two Imperial machines to put down there (three weeks ago) were a couple of D.H. 86s carrying Christmas mails.

COMMERCIAL AVIATION (CONTINUED)

Air France's Christmas

DURING the Christmas period a number of changes will be made in the Air France time-tables, including the cancellation of all services on Christmas Day except the West African and South American departure from Paris and the services to the Near East, Algiers and Barcelona. Supplementary services have, however, been booked up for Christmas Eve traffic, and on Boxing Day there will be three services between London and Paris instead of two. On New Year's Day there will be the normal pair of Sunday London-Paris services and one Scandinavian service will also operate.

Glasgow's Airport

SOME time ago it was suggested that the Glasgow Corporation might take over the R.A.F. airport at Abbotsinch for use as a civil flying centre for the area.

More recently it has been suggested by another member of the council that the ground between Spiers Bridge and Darnley would be more suitable, since it is well away from the river and, consequently, free from fog. There are good road connections between the various centres of population. No other statement has been made on the question of the new airport since the Lord Provost of Glasgow was asked by the Government to treat any negotiations as being confidential.

A Year in India

WITH the increase in trunk-route flying on the main Empire services, progress in the development of new aerodromes and new or extended air services in the Indian States has been considerable during the past year.

Apart from the establishment of new flying-boat bases at Udaipur (on the Raj Sammand Lake) and Gwalior (on the Madho Sagar Lake), five new aerodromes were established in the Indian States, fourteen more are under consideration, and eight are projected. Altogether there are now fifty-three permanent landing grounds. The Gwalior base is being equipped jointly by the Indian Government, the Air Ministry and the State concerned as a permanent station on the Imperial Trans-India service. The Raj Sammand base has shown itself to be satisfactory as a base for regular operations.

The all-up mail scheme has, of course, greatly increased the importance of internal air services. During the last cold weather Tatas operated a Bombay-Delhi service with the help of subsidies, and in six months the traffic amounted to 68,770 passenger-miles. The service was to be resumed after the rains.

At the beginning of November, last year, a new company—Air Services of India—started a service between Bombay and Kathiawar, and in April the frequency was increased to five times a week. During the short season 933 passengers were carried with a service regularity of 99.5 per cent.

Licensing the Airlines

THE first public enquiry by the Air Transport Licensing Authority, under Mr. Trustram Eve, K.C., was held on December 13. Mr. Eve said that no decisions, except on smaller points, would be given until most of the present applications had been heard.

The first was that of North-Eastern Airways, to which objections were made by British Airways and by the Corporations of Manchester and Luton. In the case of Luton the Corporation wanted the company's aeroplanes to land at their aerodrome, but N.E.A. explained that such a landing would add twenty minutes to the journey, though it was agreed that there should be some landing point north of London, and the company had made repeated application for the use of Hendon. Luton was too far north to be used as a London terminal. Manchester's objection was somewhat similar, and it was explained that the service from Manchester had to be stopped because of the small demand. The need for time-table co-ordination was the reason for British Airways' objection.

On the following day Railway Air Services' applications were heard. Opposition to the London-Belfast and London-Glasgow services appeared from North-Eastern Airways, British Airways, and the Corporations for Luton and Manchester, while North-Eastern Airways also opposed the Glasgow-Belfast application.

Managing Exeter

MR. W. R. PARKHOUSE, a pioneer pilot of the West of England, has accepted the permanent position of airport manager at Exeter. The proprietor of an engineering business in Teignmouth, Mr. Parkhouse leased Halden aerodrome in 1928 and trained many pilots there, including Mr. Whitney Straight, whose Corporation owns the new Exeter airport. He has actually been flying since 1917, when he was a pilot in the R.N.A.S.

Australian Additions

GUINEA AIRWAYS, who operate their Darwin-Adelaide service three times weekly with Lockheed Electras and Fourteens, now carry all the mail between the Qantas base at Darwin and South Australia, Victoria and Tasmania. During October the inward mail loads have been as high as 2,500 lb. on each trip and during the month preceding Christmas this load has undoubtedly been considerably increased.

By this time work should have been started on the runways which are being laid down by the Civil Aviation Board on the aerodromes at Oodnadatta, Alice Springs and Tennants Creek, which are used on the company's Trans-Australia service.

In the meantime, Australian National Airways have purchased two more D.C.3s, named *Kanana* and *Warana*, and this brings the total number of Douglas machines imported for Australian use to eight—comprising four D.C.3s and four D.C.2s. One of the latter, it will be remembered, was completely destroyed in an accident on October 25.

While awaiting delivery of two Lockheed Electras, which have been ordered by them, the MacRobertson Miller Aviation Company have been making use of two D.H.86s chartered from Qantas. Even so, this company has had some difficulty in dealing with the mail loads and they should be glad of the Lockheeds, which ought, by now, to be in service.

In their turn MacRobertson Miller have recently sold one of their Dragons to Airlines (W.A.) for the Perth-Wiluna-Kalgoorlie service, which was previously covered by a Stinson Reliant. The company's schedule now provides for meeting the westbound A.N.A. Douglas from Adelaide.

More De-icing Advice

FOLLOWING a pamphlet on de-icing in general, which was published a month or two ago, the Stationery Office has now issued another pamphlet giving the findings of the Civil Airworthiness Committee on the subject. This is a general report on the de-icing of wings, tail and control surfaces.

Dealing individually with the four possible methods of protection-paste, mechanical de-icer, chemical de-icer and exhaust heat—the committee describes the experience which has been obtained by airline companies in these different methods. Apparently, for instance, Imperial Airways considers that Kilfrost, though not an ideal method of ice protection, does prevent serious building-up, while British Airways, on the other hand, who are trying several kinds of paste, consider that none of them really control ice adhesion, though agree that they prove useful in giving some protection to hinges and such parts. Neither does the R.A.E. consider that the pastes, in their present form, are a reliable safeguard.

The Establishment, on the other hand, found that correctly installed Goodrich equipment was 90 per cent. effective in protecting leading edges, and found the Dunlop system to be satisfactory in principle, though certain operational difficulties have yet to be overcome. At the same time, Imperial Airways, after a good deal of experimental work, believe that eventually the Dunlop system will be satisfactory, though they suggest that the necessary weight of this equipment will make serious inroads on the payload. British Airways, who have had more experience than any other operator in this country of the Goodrich system, have found certain difficulties—notably a case when a ridge of ice collected on the upper surfaces of the wing just aft of the shoe. No first-hand information is available on exhaust heating methods of ice-protection, but the Committee understands that D.L.H. have obtained successful results with this system.

In brief, the Committee recommends that the Goodrich de-icer, the Dunlop ant-icer and any approved type of paste shall be deemed as being suitable for protection while further experiments are being made. They think that development work on exhaust-heating methods should be pressed forward in this country.

COMMERCIAL AVIATION (CONTINUED)

Unification in Japan

IN order to effect the unification of air transport in Japan, and also to facilitate the development of air lines in other countries, a new company is being organised as an amalgamation of the Japan Air Transport Company and the International Air Line Company. This transaction has been approved by the Government. The new company will be called the Dainippon Air Line Company and will undertake the operation of all air lines inside and outside Japan.

The subsidy which the Government is at present paying to the Japan Air Transport Company will be paid to the new concern, which was to have been established last month. The capital of the new enterprise will be 25,500,000 yen. Investments in kind will be 10,000,000 yen by the Japan Air Transport Company and 5,000,000 by the International Air Line Company. Cash investments will be 10,000,000 yen by the Japan Air Transport Company, and 500,000 by the promoters of the new company. It is also announced that the capital is expected to be increased eventually to 100,000,000 yen for the purpose of improving and extending services.

A Meteorological Year

"Annual Report of the Director of the Meteorological Office;" 1s., *His Majesty's Stationery Office.*

NOWADAYS there is little need to emphasise the importance of accurate weather forecasts for all forms of flying, whether military or civil. Without the work of the professional forecaster the long-distance non-stop air service would be practically impossible, and modern methods of bad-weather approach to aerodromes mean that every forecast and weather report must be exceedingly accurate.

In the old days it was necessary only to know that such and such an aerodrome had visibility of less than half a mile (or a cloud ceiling of less than 500ft.) for a service to be cancelled; now it is safe and possible to complete a journey when the cloud height is at, perhaps, 300ft. and visibility less than a quarter of a mile. We have not yet reached the stage when genuinely blind landings can be made.

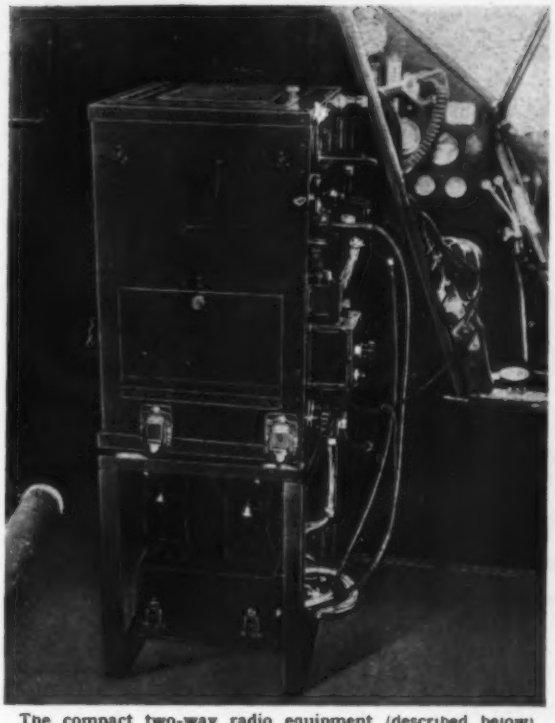
Unfortunately, transport technique, if not that of Service flying, is still outstripping the work of the meteorologists. The modern type of machine is designed to fly at ten to fifteen thousand feet and it is still not possible to obtain accurate information, particularly about wind strength and direction, about such heights.

In the Report very little mention is made of upper air investigations, but the little is of vital importance. It is explained that a new type of radio pilot-balloon or pilot-sonde, designed by the Instruments Division of the Meteorological Office, has been under test for some time and has proved satisfactory. An order for a large number of these has been placed and they will shortly go into general use. The work of developing the necessary instruments has been going on in collaboration with the National Physical Laboratory for the measurement of wind and for the determination of pressure and temperature in the upper atmosphere. For the former it is necessary, of course, to locate the balloons by D/F bearings from two ground stations on a base line; the necessary test stations are being erected on Salisbury plain. For low-altitude investigations by night a number of meteorological stations and aerodromes have been equipped with a special searchlight for obtaining the height of the base of a cloud sheet.

To the average person the most useful sign of the work of the Met. Office is the regular broadcast of reports from the Borough Hill station and a full hourly service for eighty-seven stations is now included. The value and convenience of these broadcasts seems to be very rarely appreciated by the ordinary pilot, whether private or charter. For those who have not been in the habit of making use of the information, is is worth reminding readers that the reports are telephonic and are made on a frequency which can be picked up by any ordinary receiver.

Among the most interesting work has been that done at the meteorological stations at Foynes, on the Shannon, and Botwood, in Newfoundland, in connection with the transatlantic experiments. Subsequent to the flights last year, conferences were held at Toronto and Dublin to review the organisation and, as far as possible, to effect the arrangement for the exchange and supply of the necessary information.

During the year a new system of communication between meteorological stations was initiated by the installation of direct teleprinter connections, and work is proceeding on a large extension of this method of communication.



The compact two-way radio equipment (described below) which has been developed by the Canadian Marconi Company for medium-sized transport aeroplanes. This example is actually fitted in a Quebec Airways' Rapide.

Two-way Unit

A SPECIAL two-way R/T W/T radio layout has recently been designed by the Canadian Marconi Company for use in Quebec Airways' D.H. Rapides, which carry the mails between St. Hubert and Rimouski in the summer and fly in the Gulf of St. Lawrence in the winter.

This equipment is of some interest, particularly to operators of comparatively small machines, since the whole of the equipment, including the dynamotor, is installed in a quickly removable duralumin frame which bolts on to the floor and to the bulkhead behind the pilot's compartment. It is designed to be operated by the pilot himself, and both the transmitter and the receiver provide crystal-controlled tuning on either of the two frequencies, which are selected by a switch on the panel. A milliameter on the dashboard gives the pilot a visual indication of the performance of the transmitter.

Mail Rates in the U.S.

UNITED Airlines, which carry more mail than any other operating company in America, have asked the Civil Aeronautics Authority to fix new and settled rates for mail carriage, requesting the use of the pound-mile method as a basis for payment.

Their view is that the operators' compensation should be measured by the amount of work performed, and under the new Civil Aeronautics Act the Authority is empowered to prescribe the pound-mile basis for compensation. So far, apparently, the mail has been carried by America's domestic airlines at a loss since the change was made after the "great air mail scandal."

Canadian Co-operation

A CENTRAL company to direct all commercial air traffic of the major Canadian air transport companies, other than the Government-owned Trans-Canada Air Lines, was formed on November 1 in Regina, Saskatchewan, under the name of Passenger and Express Air Services. The new company is aiming at elimination of the present duplication of base radio facilities, traffic offices, fuel depots and collection agencies across the Dominion. Companies forming the central organisation include Canadian Airways, Winnipeg; Dominion Skyways, Montreal; Starratt Airways and Transportation Co., Hudson, Ont.; and Quebec Airways, Montreal.

The Guernsey Service

BEFORE next summer season the Guernsey Aerodrome at La Villiaze should be ready for use and, according to the applications which have been made by the company to the Air Transport Licensing Authority, Guernsey Airways will be operating services between this point and London, Southampton, Exeter and Brighton. Guernsey Airways, of course, is a subsidiary of Jersey Airways.

More Ju.90s for South Africa

FOLLOWING the order for two Junkers Ju.90s, which are due to be delivered to South African Airways next June, it is reported that six more of this type have been ordered by Mr. Pirow, the South African Defence Minister, during his visit to Germany. The Ju.90 is, in its normal form, a thirty-seater with four D.B.600 or B.M.W. Hornet engines.

K.L.M., incidentally, appear to be interested in a service to South Africa, via the west coast route.

Tragically Unique

ONE of the most curious and unfortunate accidents in air transport occurred in the early morning of November 29 near San Francisco. The machine, according to present accounts a Douglas D.C.3, of United Air Lines, put down because of fuel shortage in the sea near San Francisco during a hurricane which prevented it from reaching Oakland.

The pilot landed the machine on the water quite satisfactorily about a thousand yards from the shore, but it was then washed against the rocks and started to break up. The passengers and crew swam to the shore, but only the pilot and one of the passengers were saved. The five other occupants, including the second pilot and a third member of the crew, were drowned.

Inside Ceylon

IT appears that the Government of Ceylon intends to pursue, from now on, quite a vigorous aerodrome policy, and new landing grounds are to be laid out near six towns. These are Kandy, Nuwara-Eliya, Galle, Batticaloa, Jaffna, and Anuradhapura.

Mail and passenger services shall, it is intended, be operated to these various points from Colombo (Ratmalana), and apparently the scheme is backed by local businessmen with the co-operation of the Aero Club of Ceylon. The layout of aerodromes will, in addition, give the club members an opportunity of making cross-country flights.

Before next spring it is expected that Ratmalana will have night-flying equipment installed, while extensions are being made to the area, and new hangars and buildings are being erected. Work on the landing area will include the provision of concrete runways if K.L.M. eventually decide to fly to Batavia via Colombo. As it is, the extensions will be appreciated by Tata's, who have already taken over one of Qantas' old D.H.86s. As previously explained, there is also the possibility that Bolgoda Lake, which is adjacent to Ratmalana, will be made into a seaplane base, and Colombo may, in that case, be used by Imperial Airways if the need for operating over a different route ever becomes obvious.

COMMERCIAL AVIATION

Sub-Stratosphere Experiments

SOME useful high-altitude experimental flying has been carried out during the past few weeks by the *Laurent Guerrero*, the four-engined Farman phototype belonging to Air France-Transatlantique. This is being prepared, with two other similar machines, by Capt. Paul Codos for North Atlantic experiments next year. The Farmans are fitted with pressure cabins for sub-stratospheric flying.

On one flight, from Toussus to Le-Noble, the machine spent four hours at a height of 25,000ft. The pilot was Lucien Coupet and he had with him a mechanic and one of the Farman's Company's engineers. The Farman Company is now, incidentally, part of the Societé Nationale de Constructions Aéronautique du Centre group.

Iceland Again

A YEAR or two ago Pan-American Airways became interested in the idea of operating a North Atlantic service via Iceland and Greenland. It seemed possible at the time that the Norwegian company, D.N.L., might take over a section of the route in pool with P.A.A., and to this end D.N.L. purchased a Sikorsky S.43 amphibian.

Now Pan-American Airways and the Government of Iceland have formed a new joint stock company to operate services in and from Iceland. In this company P.A.A. hold a controlling interest, and the company proposes to purchase ten freight and passenger machines for use, by way of a start, on local services.

Guidance at Speke

AN interesting development in fog-lines is being laid out at Liverpool Airport. This line, which will ultimately run right across the aerodrome on the line of the medium-wave approach beam, has four sectional divisions. The divisions will be some 500 yards or so in length, and each will be easily distinguishable. The first section will consist of a double line, the second of a single line, the third of a broken line, and the last of a series of crosses. With this distinctive marking, pilots, when they first catch sight of the line will know exactly where they are in relation to the aerodrome boundary.

More interesting still, there will also be a tributary line to guide pilots when taxying to and from the buildings. This will be laid out as a dotted line. At the boundary, the first section of the main line will turn back upon itself to form a large loop which will serve the double function of giving pilots the opportunity of turning round at the very start of the longest run and, also, of assisting an approaching crew in the initial location of the line from the air. The line will be finished at about the same time as the new station buildings are ready for use, early in January.

These new station buildings, which have already been illustrated in *Flight*, can be appreciated in their real architectural worth now that the builders' scaffoldings have gone. The buildings are ranged in terraces, with railed balconies making a triple frontage to the flying field, from which the general public will be able to watch or have easy access to the restaurants on the second floor. There is a spacious reception hall, with plenty of company and administrative office space. Rising centrally is the somewhat obstructive control tower.

It is proposed to enlarge the present boundary so that the beacon runway will be over 2,000 yards.

PROVINCIAL TERMINAL. Now that the main buildings have been completed at Speke airport, Liverpool, the control tower—which is a tower in the true sense of the word—is more in keeping with its surroundings. Liverpool's airport buildings and hangars are at present the largest and most complete in the provinces.

(CONTINUED)

The NEW KARACHI

THE institution of the Empire air mail scheme has meant that in India, as elsewhere, very serious attention has been paid to the work of providing adequate ground facilities both for trunk and feeder services

The latest addition to the number of works being and to be carried out by the Civil Aviation Directorate in India is the new administrative building at the Drigh Road Airport of Karachi. This was formally opened, on December 5, by H.E. The Governor of Sind, Sir Lancelot Graham.

At the same time India's first large-scale air rally was held, in which machines belonging to the different aero clubs took part; this affair took the place of the annual Viceroy's Cup air race. Thousands attended the rally and the ceremony and there is little doubt that aviation in general has been brought before the public in India with real results. The very keenest enthusiasm was displayed not only by the spectators, but also by those responsible for putting on the show. What evidently appealed particularly to the crowd was the fact that Indian pilots made quite a good showing in the various competitions held—a fact which instilled confidence amongst the spectators, who went up for joy-rides in large numbers.

The success of the event was in no small measure due to the arrangements that were made by the airport authorities, and the new administrative building lent itself admirably as a setting for the function. This building, designed to meet all the requirements of India's largest air terminus, is well laid out, and provides accommodation for all the branches of control, traffic and administration. From the time a passenger arrives to the time at which he or she departs, the least amount of discomfort will be experienced, as the entire procedure of medical inspection, Customs, passport and other formalities will be assisted by the careful layout of the building.

Incoming passengers enter by a particular passage and pass from one department to the next in their progress towards the central hall, which is the focal point of the building, and from which the three wings radiate. This central hall is 50ft. in diameter and around it are situated the offices of the transport companies, with the post and telegraph office. There are two floors, and twelve massive columns support a large dome.

The scene at the official opening of the new Karachi airport building by the Governor of Sind. The central control block is shown.

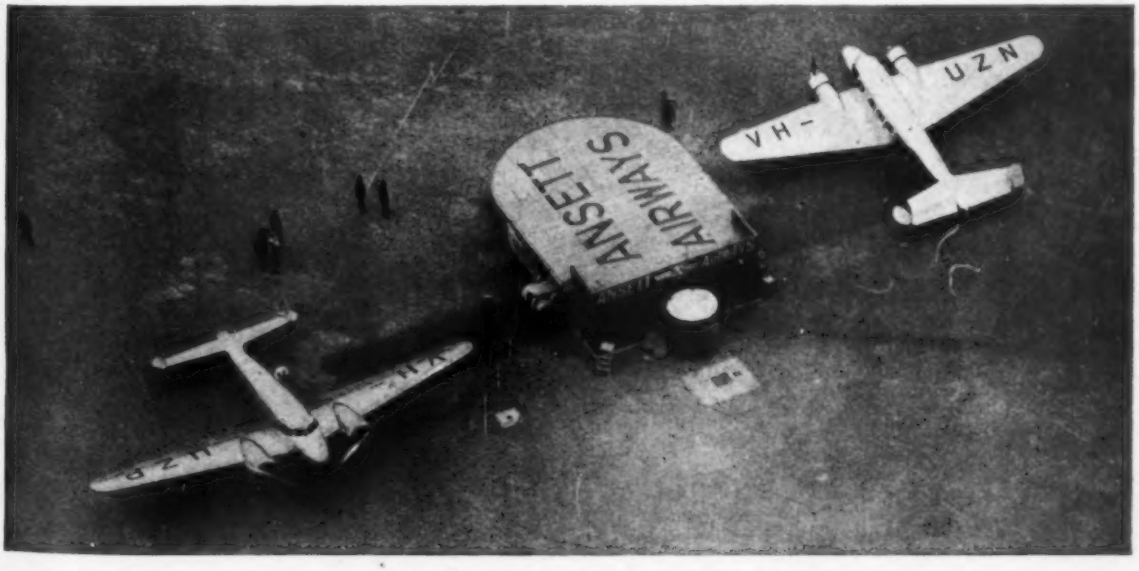
In the left wing is a spacious restaurant on the ground floor. Above this there are twenty-four single- and double-bedrooms. In the right wing of the building, on the first floor and reached by means of the circular gallery from the central hall, more bedrooms have been built, all for the use of passengers and crews using the airport. The ground floor of the right wing offers accommodation for the medical, Customs and postal departments.

The second floor is reserved for the control and wireless officers, the room for the former being oval in shape. In it are the latest devices for lighting control, communication and general purposes.

To the right of the administrative buildings is a new hangar, large enough to house the biggest commercial machines.

I.N.A. Extensions

ON November 15 Indian National Airways extended their Karachi-Lahore mail and passenger service to Delhi. This service is being operated three times a week, using single-engined Beechcraft E17B biplanes, three of which have been purchased by the company. Needless to say, the through service connects at Karachi with that of Imperial Airways.



SIMPLIFICATION: In Australia it is usual for the airline companies to put up their own airport buildings. This is a somewhat unique example of such a building at Mildura airport, with two of Ansett Airways' Lockheeds beside it. The position of this little Ansett building, away from the aerodrome boundary, should simplify the work of loading and unloading.

CHRISTMAS READING

—and Some More for the Days to Follow

Twopence Coloured

"The Plane Truth," by M. J. B. Stoker; 3s. 6d., G. Duckworth and Co., Ltd., 3, Henrietta Street, London, W.C.2.

POSSIBLY because it is so difficult, in so doing, not to be handsomely libellous, very few attempts have yet been made to give the general public some idea of the particular brand of humour which is current amongst flying people. The very best things that are said by pilots to pilots are usually personal to the point of being unkind, and a great deal of the sheer funniness in flying has a part-tragic background which cannot very well be put into print.

In *The Plane Truth*, Mr. Max Stoker, who is an Autogiro instructor by profession, has attempted the almost impossible He has tried to write so that the lay reader will be amused, and at the same time to introduce a sufficient number of "inside" allusions to appeal to the man or woman who really knows what it is all about. In the circumstances, he has succeeded very well, but the parts of the book which really amused us tremendously might fall a little flat on the ordinary reader. For instance, he debunks what is known as private flying—whether that involved in going from here to there or merely in learning to be a "private pilot."

His instructional patter (entitled "Conversation in the Air.") is magnificent. . . . A.: "Lovely day." B.: "Studleigh Bay? No, surely not, we've only just started." A.: "I said *lovely day*." B.: "Oh yes, topping." A.: "What's popping?" . . . . A.: "Don't bawl right into the tube, you'll deafen me." B.: "What is that about a ball in the tube?" A.: "I said BAWL—shout." B.: "Yes, we'll have one when we get there."

Mr. Stoker's forced landing study in which all suitable fields are discovered at the last moment to have been commandeered or built on by somebody or other is true to life, and the history of a shadow factory is a fairly accurate one.

In spite of his Hanworth associations the writer only mentions the Autogiro once, and then he manages to explain the whole theory of the device in a single sentence: "They have wings which spin round. This is most satisfactory because most wings want to spin by nature, so if you let them spin all the time they are quite happy and won't do you any harm." That, if not quite technically accurate, is more likely to be understood than the somewhat heavy method of explanation which is normally used.

Quartette of Thrillers

"Skies Unknown," by Capt. J. E. Doyle, D.F.C.; 3s. 6d., Wright and Brown, Ltd., 4, Farringdon Avenue, London, E.C.4.

"Death Flies Low," by Neal Shepherd; 7s. 6d., Constable and Co., Ltd.

"The Pirate Island," by D. E. Heming; 3s. 6d., A. and C. Black, Ltd., 4-6, Soho Square, London, W.1.

"The Flying Kidnappers," by Michael Cronin; 3s. 6d., A. and C. Black, Ltd., 4-6, Soho Square, London, W.1.

FOUR thrillers, all acceptable Christmas books for the younger generation. The first is a Great War air-fighting story, obviously written from experience. For the rest, extracts from the publishers' "blurbs" will indicate their nature:—

Death Flies Low: "When a key-man in one of the aircraft shadow factories dies suddenly, brutally and for no obvious reason, Whitehall suspects sabotage, and Government Department calls to Government Department. The result of these alarms and excursions in high places is that Chief Inspector 'Napper' Tandy and Detective-Sergeant Bill Holland are specially detailed to investigate the case."

Pirate Island: "Gun-runners, taking arms unlawfully to the troubled corners of the earth, have an air base in one of the smaller islands of the Azores, and are laughing at the efforts of the law-abiding nations to curb their activities. Admiral Sir John Hawkins determines to take a hand against them and, with Pincuss, his faithful ex-petty officer servant, sets out on the trail."

The Flying Kidnappers: "Ludvig Branner was the power behind an international arms 'ring' whose secret aim was the destruction of the peace of the world. But when he decided to sabotage the plans of the Westland Aviation Company [Our novelists are apparently in search of realism—ED.] he reckoned without Roger Bellairs, schoolboy son of the Company's Managing Director, and Sam Wilson, an impertubable American youth with an irrepressible fund of humour and resourcefulness"

More Ground Training

"Air Piloting," by Virgil Simmons; $3, Ronald Press Company, 15, East 26th Street, New York.

IT is unfortunate that such a very thorough book dealing with flying training should be written in America and for American pilots Though the basic principles of training are, of course, entirely similar to ours, the routine is somewhat different, and the syllabus includes, where commercial pilots are concerned, a good deal of information about radio facilities which are not in use to any extent outside America.

The chapter covering the private pilot's course shows just how much more difficult it is for an American amateur to obtain his licence than it is for one in this country. Not only are the actual flying requirements a good deal stiffer, but the examination involves a knowledge of D/R, maps and charts, and meteorology.

Altogether *Air Piloting* is a very good study of flying training methods and, though not to be recommended as a textbook for pilots in this country, should provide a good deal of new and interesting information for those who are really inquisitive about practical ways and means.

War Pilot Looks Back

"An Air Fighter's Scrapbook," by Sqn. Ldr. Ira Jones, D.S.O., M.C., D.F.C., M.M.; 10s. 6d., Ivor Nicholson and Watson, Ltd.

"TAFFY" JONES is a fighting man. His list of decorations won in the war is quite sufficient evidence of that. He was a member of No. 74 Squadron in which Capt. (afterwards Major) "Mick" Mannock, V.C., was a flight commander, and the squadron wrought great havoc among the German machines "Taffy" has some stirring stories about its feats.

The most interesting section of this book is that which tells of the author's experience with General Ironside's force in North Russia after the Armistice with Germany had been signed. Not very much has been written about this strange incident, and "Taffy's" diary gives a lot of extremely interesting information about it.

Then follows the period of his post-war service in the R.A.F., and again the story is full of most interesting incidents. At one time this exceptional air fighter was reported on as "average—on Avros,' and he admits that he had never been properly taught to land a machine. Evidently he improved his flying, for he became one of the experimental pilots at Farnborough, and thoroughly enjoyed the experience. After two years there he came to the conclusion that "British military and civil aviation would be in a poor state without it. . . . Farnborough may work slowly, but their conclusions are reliable."

The final chapters of the book justify the title of "Scrapbook," for the author writes (rather disjointedly) about incidents in his life, about celebrities whom he has met, about the history of flying, and he also gives his opinions on all sorts of subjects. Altogether a breezy and very readable book.

Novices' Encyclopedia

"How to Become an Air Pilot," by Capt. R. L. Preston; 3s. 6d., Sampson Low.

IN its sixth edition, this little handbook for those who are just beginning to be interested in the idea of learning to fly is undoubtedly the most complete guide to all the ways and means which has yet been published. The first edition came out in 1930, and this last one is really very different, and credit must also go to Sqn. Ldr. Spence, who did the editing in both this and the previous volume

In *How to Become an Air Pilot* the costs of and requirements for the "A" licence are first dealt with, and the Civil Air Guard scheme is briefly described, with scales of insurance compensation for those who are interested in such things. Thereafter the sequence of flying instruction and the various "A" requirements are briefly explained.

The major part of the book is devoted to the technical examination for this licence, and the series of set questions and answers which are given should be sufficient for *viva voce* purposes. The section, which covers nearly a hundred pages, includes a coloured inset vividly showing the signals used at aerodromes and the lighting arrangements for various types of aircraft and ships. Afterwards, chapters are devoted to advice on the purchase and cost of private aeroplanes as well as to information on foreign touring and the like. Finally, after a short general-knowledge chapter dealing with maintenance and

navigation problems, a few pages are devoted to motorless flying.

This encyclopedia of initial information for amateur pilots is not very much longer than the previous editions, but much more information is given and this information has been brought most carefully up to date. The saving in space has been made possible simply by leaving out the somewhat long list of light aeroplane clubs which appeared in previous issues. Information of this kind can always be obtained elsewhere and has no real place in a book of this kind.

Authentic

"Listen! The Wind," by Anne Morrow Lindbergh; 7s. 6d., Chatto and Windus.

FLYING is a comparatively new thing to literature, and so far there have not been published very many really good books giving the authentic atmosphere. One of the best is *Sagittarius Rises*, by Cecil Lewis, and Elliott White Springs, both in his stories and in his editing of *War Birds*, gave a true picture of the war-flying mentality. But neither in biography nor in descriptions of what are known as "epic flights" has sheer literary merit been very much in evidence. Yet flying should provide a greater scope for real writing than any other subject.

By way of a sequel to her book, *North to the Orient*, Mrs. Lindbergh has provided in *Listen! The Wind* a notable addition not only to flying literature, but also to writing in general. She describes the last part of Col. Lindbergh's 1933 survey flight with a Lockheed Sirius on floats. The book opens during the crossing between Africa and the Cape Verde Islands, where afterwards it was found that the conditions of wind and sea made it impossible to take off for South America with the load which had to be carried. They returned to Bathurst, and eventually, after three attempts on different days and nights, got off successfully in the early hours of the morning for the flight to Natal.

On the face of it there does not seem to be much to talk about in two flights of this nature, but Mrs. Lindbergh writes not of flying as the pilot and engineer know it, but as a person of considerable sensibility. Her descriptions are nothing less than superb. The air of waiting, for instance, which is so much a part of all flying, is perfectly emphasised. When there are dozens of alternative schemes in planning any venture one sometimes has the impression of being involved in an indescribable tangle of threads which can never be unravelled. ". . . Some of the loops must remain taut in our fingers; others we can play with, holding them precisely, pairing them exactly, doubling them back and forth, in and out, to make the pattern. But if our fingers slipped and lost a single thread, if one loop were forgotten, the whole intricate taut structure, so rigidly shaped at one moment, could, in the next, shatter its form completely and ravel out into a meaningless piece of tangled thread. . . ." That is exactly how it feels.

They tried to get the Sirius off in the daytime at Bathurst, failed, removed some almost necessary equipment and a good deal of fuel, tried unsuccessfully again at night, and finally succeeded on the very last moonlit night. If they had failed then the crossing might never have been made.

Perhaps Mrs. Lindbergh's best description is that of the little compartment in which, as co-pilot and radio operator, she had to live during long non-stop passages. How often, for instance, have we seen in an odd corner of a cockpit or control cabin a group of ". . . nameless screws, washers, bits of grit, crumbs and dust, which, gathered there, danced perpetually in a tiny whirlwind of vibration on the floor in a corner of the cockpit? . . ." That "tiny whirlwind of vibration" tells the whole story. A superb book for flying and non-flying people alike.

HANDLEY PAGE CELEBRATION

THAT the English Electric Co. is to build Hampdens was revealed officially for the first time by Capt. Harold Balfour at the staff dinner of the Handley Page Company, held at the Wharncliffe Rooms, London, on Thursday of last week. The assistance given to the English Electric Co. by Handley Page, Ltd., was such that the former firm hoped to get into production in record time. The Handley Page firm, "the oldest in the country," had already established records in production, but he warned the H.P. staff that they would be called upon for further effort next year.

The Under-Secretary of State for Air expressed his gratitude to Mr. Handley Page for going to Canada and arranging aircraft production there. He finished by telling the following story about "H.P.": After extolling to representatives of Canadian industry the merits of British aircraft in general, and Cricklewood products in particular, Mr. Handley Page had concluded: "But, gentlemen, I have taken up too much of your time by talking to you of my own products. Now let us have your views. What do you think of the Hampden?"

The guests were welcomed by Mr. S. R. Worley, chairman of Handley Page, Ltd.

Mr. F. S. Gaylor (who looks after the firm's legal interests) referred to the managing director as a good technician and a clever man of affairs, but preferred to think of Mr. Handley Page as one whose personal friendship he valued highly.

Mr. F. Handley Page described himself as a hot-air smoke screen between the Air Ministry and those who did the work at Cricklewood, the guests of the evening. During the past year they had changed over from the Harrow to the Hampden, and they were now putting a new type into production.

At Cricklewood, Mr. Handley Page said, they had a system of production not equalled anywhere in the world, and he quoted Mr. Theodore P. Wright as saying that they were ahead of America in production methods.

If certain negotiations with the local Council matured, he hoped they would soon have a very nice sports ground near the Welsh Harp, and that he and Mrs. Handley Page might have the privilege of presenting it and the pavilion in recognition of all the kindness to them of Handley Page employees. He thanked them all for their good work during the past year and said he hoped that when the pay envelopes came around the next day they would find that the firm had thanked them in a more tangible form than he could do at a dinner.

THAT PRESENT PROBLEM

THOUGH these suggestions may first be read by hopeful recipients rather than by potential donors, they may at least start a train of thought if shown by the former to the latter. Admittedly, aviation offers fewer opportunities for magnanimous relatives than does, say, motoring. Aircraft owners do not use fog-lamps or garage-heaters.

The most obvious ideas are for flying clothing, and such gifts will be particularly acceptable to Civil Air Guard members, who have to provide their own helmets, goggles, and so forth. A wide selection at an equally wide range of prices is offered by such specialists as D. Lewis, Ltd., 184, Great Portland Street, London, W.1; S. Lewis, 27, Carburton Street, London, W.1; Moss Bros. and Co., Ltd., Covent Garden, London, W.C.2; E. B. Meyrowitz, Ltd., 1a, Old Bond Street, London, W.1; and Gieves, Ltd., 21, Old Bond Street, London, W.1. There are also other aids to aeronautical comfort, such as Moseley "Float-on-Air" cushions.

Those who work in noisy surroundings in test shops and aircraft factories will appreciate a pair of ear defenders by the Mallock-Armstrong Ear Defender Co., 39, Victoria Street, London, S.W.1.

Useful navigational gadgets, *i.e.*, course-and-distance calculators, are made by such well-known firms as Smiths Aircraft Instruments and Simmonds Aerocessories, Ltd., while L. Lipton, 614, Old Ford Road, London, E.3, specialises in ex-R.A.F. C.D.C.s.

Many of the aforementioned items, too, are handled by aeronautical agents, such as Airco, Ltd., 3, St. James's Square, London, S.W.1.

A really handsome and impressive gift is a silver scale model aeroplane, and the Goldsmiths and Silversmiths Co., Ltd., 112, Regent Street, London, W.1, have specialised in such things for many years. They also have a wide selection of personal jewellery, such as brooches, cigarette cases, etc., bearing the R.A.F. badge or any aero club insignia to order.

Books are likewise practical gifts, and some appropriate contributions to Christmas reading are reviewed on pp. 578d-579 of this issue. Then there is the *"Flight" Handbook* (3s. 6d., Iliffe and Sons Ltd., Dorset House, Stamford Street, London, S.E.1), which probably provides the finest possible means of picking up a basic knowledge of aviation in the shortest time and at the lowest cost. Sir Isaac Pitman and Sons, Ltd., have a really impressive list of books on aeronautical subjects, the McGraw-Hill Publishing Co. and the Technical Press, Ltd. (5, Ave Maria Lane, London, E.C.4) specialise in aeronautical technical works, and the Eversley Press (33-34, Craven Street, London, W.C.2) publish a standard work on navigation, *Martin's Air Navigation*.

Finally—and this is probably the most universal Christmas gift of all—there are Gold Flake and Capstan cigarettes and Airman tobacco (W. D. and H. O. Wills), and Player's Navy Cut and other cigarettes.

EVERYBODY is PLEASED

Martlesham Dines the Industry

Candid camera at Martlesham. On the left is Air Commodore N. J. Gill, the "Father of Martlesham." Listening to the chairman is Air Commodore Roderic Hill, the new Director of Technical Development at the Air Ministry. Group Capt. "Reggie" Smart is recounting a story (which he might be forgiven for not committing to memory), to the amusement of Mr. F. Handley Page.

MANY years ago *Flight* headed its report of the annual dinner given by the C.O. and officers of the Aeroplane and Armament Experimental Establishment to representatives of the aircraft industry: "Martlesham is pleased," the theme being that if an aircraft constructor wishes to impress an editorial staff which has become somewhat blase in the course of the years, he invariably clinches the argument by stating that Martlesham is very pleased with his latest machine. If that does not convince the sceptic nothing will.

That the same spirit should persist after a difficult period of producing high-performance aircraft with peculiarities not known a few years ago is testimony not only to Martlesham, but to the designers and constructors of the latest types of aircraft. The general feeling of the industry was well voiced by Air Comdre. Roderic Hill, the new Director of Technical Development, at last Friday's Martlesham dinner, when he said that the reputation of Martlesham has never stood higher than it does at the present time, thanks to a number of brilliant C.O.s, of whom the retiring one, Group Capt. H. G. Smart, relinquished his post last Saturday to take over at Hucknall.

The new C.O., Group Capt. B. McEntegart, comes from the Experimental Section of the R.A.E. at Farnborough. Previously he had been at the Air Ministry, in the Directorate of Research and Development, as it then was, and there had been intimately concerned with equipment, especially in connection with the so-called "Mock-up conferences." Martlesham's new chief is thus well versed in the requirements of the Service and familiar with the idiosyncrasies of designers. His knowledge of both sides should be of inestimable value, and it was small wonder that the guests, that is to say, "The Trade," applauded most heartily when Group Capt. Smart said, in the course of his speech of welcome, that the new C.O. was "the right man for the job." Quite obviously the aircraft industry thinks so, too. Group Capt. "Reggie" Smart had become extremely popular during his two-year term at Martlesham, and there is little doubt that his successor will maintain the reputation of Martlesham.

Group Capt. Smart, in proposing the toast of the guests, used the word friends in preference, and did so deliberately. He regretted to have to leave Martlesham, but knew it would be in good hands with Group Capt. McEntegart. He jestingly remarked that he felt it his duty to warn his successor that the Martlesham boys could be led, but not driven, and concluded by referring to certain members of his staff in terms which delighted the audience because of the veiled but by no means concealed hints about the little peculiarities of each.

Air Comdre. Roderic Hill, the new D.T.D., expressed his satisfaction at being at Martlesham again after a long absence, and recalled that he had visited the station on and off for some 21 years. As D.T.D. he liked to speculate on the problems of aircraft design. He thought one could approach the subject in two ways: act first and think afterwards, or one could first think hard and then not act at all.

Sheet-metal work was the order of the day, and the work was carried out by people who were called rollers. They were very important people, and one of their most important duties was to make tea. The annealing furnace was very useful for this purpose. There were three sorts of rolling, straight, curved and reverse-curved, the last named so much sought after by customers! When the parts of an aircraft had been rolled they were passed to the inspection department. This was always placed in the darkest corner of the works. After a cursory inspection the part was rejected by the inspector. This showed that inspection was necessary and provided more work for the rollers.

The Art of Designing

The fact that Air Comdre. Roderic Hill is himself an artist of no mean ability was no doubt responsible for his final reference to aircraft designers. Joshua Reynolds, he said, had emphasised that almost any artist could paint individual details of a picture, but composition was the really difficult thing, and the thing which mattered more than anything else. So with aircraft design. The general layout and the relationship of one detail to the other details was what determined the qualities of an aeroplane.

From which, thank goodness, one may deduce that the new D.T.D. regards aircraft design as an art rather than a science.

Mr. F. Handley Page expressed his pleasure at finding that, although faces changed at Martlesham, the good feeling between the official testing establishment and the aircraft industry remained as good as ever. Martlesham was, he said, an inspiration to the whole British aircraft industry. He caused amusement by remarking that Martlesham had been mystified by a certain aeroplane, type not specified. How was it that it could carry such a big load such a long way at such high speed? To one special type of aircraft construction he referred as "the snake's elbow."

Russian Long-distance Pilot Killed

FLIGHT regrets to record the death of M. Chekaloff, one of the three Soviet pilots who, in June, 1937, extended the world's long-distance record to 5,200 miles by flying non-stop from Moscow to San Francisco in an A.N.T. 25 monoplane. Their record has since been broken by the Vickers Wellesleys of the R.A.F. Long-range Development Unit.

B. Chekaloff, who was 34 years of age, met his death in an accident to a new machine which he was testing.

Women and Aviation

A SPECIAL effort to interest women in aviation is being made by the Forum Club, which intends to give a further series of lectures on aeronautical subjects, followed by social hours.

H.R.H. Princess Marie Louise, president of the Forum Club, has now honoured the Aviation Section of the Club by consenting to be its president also. Members of the Aviation Committee include Mrs. Ivor McClure (chairman), Miss Pauline Gower, Mrs. Pearse (Miss Dorothy Spicer), Miss Amy Johnson, and Mrs. Alan Macdonald.

Women interested in the new series of meetings may attend without the obligation of full membership: details are obtainable from the secretary, Miss D. A. Parr, M.B.E., Forum Club, 6, Grosvenor Place, London, S.W.1.

Our Energetic S. of S.

SIR KINGSLEY WOOD is indefatigable in his visits to aircraft factories and aerodromes. He said in a recent speech that he wanted "to acquaint himself with technical and detailed matters in a more effective manner than would be possible from a mass of papers and files."

The Air Minister is certainly suiting his actions to his words. Moreover, he does not confine his air journeys to the summer months. On Tuesday of last week he flew from Biggleswade to visit the Armstrong-Whitworth works at Coventry, where he was received by Mr. F. S. Spriggs (managing director) and other officials. He then went on to the Armstrong Siddeley engine works and later inspected the Reserve School at Ansty.

PRIVATE FLYING

Topics of the Day

No Privacy

ONE way or another (by way of a seasonal aside) there is very little nowadays to justify the use of the words "Private Flying." Perhaps by the end of next year, if nobody makes any totalitarian moves, we shall know where the whole business is going.

At the moment, practically the only private part of the club flying is the grey matter of those responsible for the C.A.G. scheme. The idea behind this scheme is still unknown to the general public. Those who prefer to take the trouble to fly their own or other people's aeroplanes on the Continent certainly have no privacy, since every move must be reported, and in some countries no one may even depart from an aerodrome without signing a special weather report and obtaining permission from the local Burgomaster.

You and I can still manufacture a light aeroplane out of sugar boxes, fit a most unsuitable motor-cycle engine, and fly the creaking result quite privately (except for the noise) within a three-mile radius of an aerodrome. But even those who, a year or two ago, were heard busily hammering bits of wood together, have given the whole thing up in disgust, though, strange to relate, there are still one or two enthusiastic people flying and modifying *Poux* in various parts of the world. They have probably not reported their activities to the Air Ministry, since, after a couple of rapid rounds in a wind-tunnel, this body, directly or indirectly, put the official foot on the *Pou* idea. Possibly, one of these days, a serious manufacturer of aeroplanes will try to make one which will be a little less fantastic in its reactions.

However, one feature of private flying still remains unaltered—the strongly varying relations between different instructors and different pupils. Even in these days of flying-for-all the aeroplane still remains a quaint instrument demanding the utmost concentration and practice for its successful navigation. While pupils continue to vary in their capacity for learning, and instructors in their patience (*vide* heading picture) there can be no standardisation of actions and reactions.

Hard of Hearing

NOW that thousands instead of hundreds are being taught, it is very unlikely in more than a few cases that any pupil goes through the whole of his tuition period with a single instructor, so that a pleasant and regular change is experienced by both of the victims. Nothing can be more irritating to the pupil than to be taken over by somebody who cannot possibly know either the worst or the best of his performance. Sometimes it seems that during the whole of the first hour after the change-over nothing whatever is learned, and that the time is spent merely in boring reiteration. I know that, just at the point when I was about to go solo, I was handed over to somebody else, and for most of two hours I made nothing but drift landings—simply because I had been told something brand new about the relation between rudder and aileron control. During part of this period, too, my new instructor was accustoming himself to the Cirrus I Moth, a type of which he had had no previous experience, for the simple reason that, for the past five years, he had been busy joy-flying in Mono-Avros. Not that I heard much of what he said.

Since the days when Col. Smith-Barry invented the present system of training it would be rather interesting to know how many thousands of hours (and, for that matter, dozens of lives) have been lost because pupils could not hear what the instructor said, and *vice versa*. Presumably it is possible, at great expense, to have a helmet and earphones made to fit like a glove, but even that is no guarantee, and the instructor may himself be either shouting in the wrong direction or placing his mouth so near to the speaking tube that the noise coming through is more like a waterfall than any possible statement of fact. Furthermore, some people's voices don't work very well.

On the other hand, those who claim that side-by-side cabin instruction is better do not have it all their own way. If in the tandem-seater the pupil cannot hear, in a closed side-by-side two-seater each of the occupants can see only too well—including, in one case, the tense expression and beads of perspiration on the pupil's face, and, in the other, the about-to-grab stance of the instructor, who has already, in his own mind, passed a vote of no confidence in the pupil. If the curriculum is very difficult neither of them can see much outside the machine, because the windscreen is almost completely opaque owing to the atmosphere of damp and horrified expectation inside.

Personally, I have every sympathy with instructors. If they talk too much in the customarily critical manner they are considered to be hard-boiled and are accused of frightening the pupil; if they say nothing at all then the pupil imagines that he is so bad that the instructor cannot be bothered to say anything any more.

Certainly the average pupil in the early stages of instruction must appear to the instructor to be the most stupid person in the world. Even perfectly clear and properly heard remarks do not mean anything at all in the excitement of the moment. During one's first spin, for instance, the patiently worded explanation of forward stick and opposite rudder (made while the entire world is whirling furiously around) is just so much sound and fury to the pupil, who, when told to go and do likewise, still has not the vaguest idea of the business. Opposite rudder, indeed; in opposition to what?

Honesty Compels

BUT to return to private flying in its true sense—which is that of making use of an aeroplane, whether one's own or somebody else's, to go from here to there. For once let us be quite honest and admit that though the amateur sort of flying, because it is so very different and

new, is the greatest possible fun, it is not really very much use.

Only two types of private owner can obtain full value from a flying machine. One is the out-and-out long-practised expert who uses a manœuvrable and comparatively slow light aeroplane which can be put down and taken out of anywhere; and the other is the extremely wealthy person who can afford to buy and use something in the airline class, complete with a full two-way radio equipment and a professional crew. Otherwise, the meagrely equipped aeroplane is an amusing but decidedly unreliable means of transport. Which does not mean to say that every keen amateur would not own his own aeroplane if he could afford to do so, and I am inclined to think that the comparatively small number of owners will be increased during the next twelve months simply because of the difficulty or impossibility of hiring aeroplanes from schools and clubs where C.A.G. training is in full swing.

To-day, as I write these comments, QBI is in force at all the London aerodromes, and no private owner without two-way radio can leave for any other destination. And in any case, quite a large proportion of possible destinations are washed out in more senses than one. Those which are not suffering from the same old QBI conditions are badly flooded. So that the private owner, however enthusiastic, gets out his motor car or goes to the railway station and makes the best of a bad job.

There are times, in fact, when private flying has a nasty dead look—especially when viewed dispassionately at or about 3 a.m. Nevertheless, a very fair number of pilots have continued to own aeroplanes during the last twelve years without a subsidy or the hope of a subsidy, so that private flying remains the one section in aviation which has, with some success, flown by itself. It is certainly no more dead, in the genuine sense, than present-day puffed-up air transport, which cannot survive in its present high-speed form without millions in subsidy.

The operation of air transport has, in fact, become something of an armament race. To run sometimes useless services at high speed and with great frequency has become a matter of international pride—like guns, goose-stepping armies and gold reserves. This country was the last to enter into uneconomic competition, and we are making good use of the subsidy in carrying unsurcharged mails.

Anyhow, there it is, and like time (whether a distorted fourth dimension or not) and the armament race, the business of uneconomic subsidisation goes on and private ownership remains almost the one and only natural flying development. The six-hundred-odd private owners would continue to use their aeroplanes if all aviation subsidies were cancelled overnight.

INDICATOR.

FROM the CLUBS and SCHOOLS

REDHILL

LAST week 160 members and their friends attended the club dance at the Burford Bridge Hotel. The flying total up to December 17 was 69 hr. 45 min. The club will be closed from Saturday, December 24, to Monday, January 2.

YORKSHIRE

The Yorkshire Aeroplane Club experienced very bad weather during the week of December 16, but they were able to fly for 30 hours.

NORTH BRITISH

With bad weather prevalent everywhere it is little wonder that only 11 hours were flown by the Civil Air Guard at Dyce.

BARTON (BEDS)

Last week Mr. H. J. Cook obtained his "A" licence and Mr. W. A. Inskip made his first solo. There will be a New Year party at the club on Sunday, January 1.

YORK AND LEEMING

Four non-flying days during last week caused a heavy drop in the flying total, which reached 5 hours. Four Moths are in service and Mr. J. H. Chappell has joined the club as instructor.

C.A.S.C.

During the week-end of December 10 a total of 11 hr. 30 min. was flown at Cambridge. Mr. C. Marsh passed his "A" licence tests and the total solo time was 6 hr. 55 min.

STRATHTAY

Although continued bad weather is still having its effect on the flying returns, there was a slight improvement last week, when 27 hours were recorded. Mr. McKelvie, a C.A.G. pupil, made his first solo.

PORTSMOUTH

Club flying last week made a total of 21 hours. In the C.A.G. section, with 119 members under instruction, a flying total of 44 hr. 5 min. was recorded. Forty-two members are flying solo and 11 members have qualified for their "A" licences under this scheme.

YAPTON

Among the C.A.G. members, two have qualified for their "A" licences and 11 have gone solo. There are 62 members under instruction and a flying total of 88 hr. 10 min. shows plenty of enthusiasm. Club flying for last week amounted to 19 hr. 10 min.

WITNEY

The Witney club will be closed for the Christmas holidays from December 23 to December 28 inclusive. Handicapped by the weather the week up to the 17th produced only 27 flying hours. Messrs. A. Baker and D. Geddes went solo and last week Mr. C. K. Jones qualified for his "A" licence and Mr. Peter Mallorie for his "B."

ISLE OF WIGHT

For the benefit of any private owners who are thinking of flying to the Isle of Wight during the holidays, Sandown and Shanklin Flying Services explain that there will be no hangarage or service facilities at Lea aerodrome, Sandown, between December 23 and December 28. Lea aerodrome is the home of the Isle of Wight Flying Club.

BORDER

Owing to the wet condition of the airport surface all flying was practically at a standstill last week. It was possible, however, for Messrs. O. S. Buglass and E. J. Sargent to complete their "A" licence tests.

HANWORTH

One of the high-lights of the week occurred when four children suffering from whooping cough were taken up in the club Leopard Moth to a height of 10,000ft. as a cure for their complaint. Messrs. H. Duckett, L. Battersby and C. Nicholson made their first solos, while Miss R. Kerly and Mr. J. Cantle qualified for "A" licences. A total of 78 hours were flown last week.

HERTS AND ESSEX

A Christmas party, followed by a dance, will be held in the club-house on Boxing Day. During the last fortnight a total of 154 hours was logged, and Mr. Dellow, a club member, with Messrs. Heath, Hulett, Such and Smith (C.A.G. members), went solo. Miss D. L. M. Lowther, and Messrs. G. W. Foley and Ivor Morgan have obtained their "A" licences.

SCOTTISH

Capt. S. F. Woods, who has been instructor to the Edinburgh Club during the past eighteen months, has joined the staff of the Scottish Flying Club. At the moment there are 74 C.A.G. members under instruction at Renfrew, and last week two more of them went solo. The weather—and particularly the floods—have recently prevented flying, but there should be a crop of first solos within the next few weeks.

NEWCASTLE-ON-TYNE

For the Newcastle Club this autumn and winter has been the worst for years in the matter of flying weather. With three instructors, seven machines and hundreds of C.A.G. members itching to fly, it could not have been more unfortunate. On December 9 nearly 200 guests turned up at the Station Hotel for the annual dinner and dance. The total flying for the week ended December 15 was 19 hours, of which the C.A.G. members contributed 14 hr. 5 min.

CINQUE PORTS

Mrs. Davis, the managing director of the club, will be away from December 22 until January 14, but Mr. Du Port will be there as usual. Flying for the week ended December 18 totalled only 32 hours, but plenty of work was in progress in the repair shops. In the lecture room, too, a series of lectures to C.A.G. members, three days a week, are proving popular. Mr. Stiles made his first solo and Miss M. Davies qualified for her "A" licence during the previous week.

BROOKLANDS

Nine machines flew to Shoreham on a "goodwill flight" on Sunday, the 11th, accompanied by Santa Claus and Miss 1939 (Miss Bremridge, aged 7). A distribution of presents from the Christmas tree in the traditional manner was followed by the issue of rum punch. In the evening a Christmas dinner was served at Brooklands. Apart from these activities a very reasonable flying total was maintained—92 hours. The club will not be open during Christmas, closing from December 23 in the evening and reopening on Monday, January 2. Aerodrome facilities will be available for private owners.

(Concluded at foot of page 583.)

CHELSEA ANNUAL

Distinguished Guests at the Aeronautical College Dinner

EVEN more than the usual large number of people attended the annual dinner of the Colleges of Automobile and Aeronautical Engineering on Tuesday of last week. This event has long since become a yearly opportunity for designers, aircraft engineers and representatives of the trade generally to get together.

In his speech proposing the toast to the aeronautical and automobile industries, Mr. C. H. Roberts, the principal of the colleges, particularly stressed both the progress of the work at the colleges and the way in which the ex-students had once again risen to responsible appointments. He quoted, among others, the instances of one who qualified in 1936 and was now superintendent engineer with one of the leading airline companies, and another, qualified in 1935, who had gone to Singapore as the chief representative of the Air Registration Board. The fact that such positions were obtained so soon after leaving, indicated, he thought, that the training provided was on the lines demanded by the industries concerned, while the probationary term system ensured that only the best type of student was retained.

Previously, Mr. Roberts had welcomed in his speech Sir Edward Campbell, M.P. (Parliamentary Private Secretary to the Air Minister) and Mr. P. C. Kidner (president of the Institution of Automobile Engineers), at the same time regretting the fact that Capt. Harold Balfour, Under Secretary of State for Air, was unable to attend. The latter was to have replied to the toast in question, and his place was taken by Mr. E. C. Gordon England. Mr. Roberts also mentioned that one of the items of practical work being carried out by the students was the construction of a new type of light aircraft (the Comper Scamp, designed by Flt. Lt. Comper.—ED.) and said that the machine was now nearly ready and should be flying within a week or two.

In his reply, Mr. Gordon England first alluded by name to all the people who might have spoken in his place and suggested that the reason why he was chosen was that his company had recently been invited to take part in "fringe" factory development in addition to "shadow" work. He spoke of the old days when flying was considered to be suicidal and insisted that the real future of civil aviation was in the hands of everybody and not only those intimately concerned with the aircraft industry. More first-class engineers were specially wanted nowadays, not only to help in the development work, but to take over when the present generation of designers had retired. So much of present-day technical information was, so to speak, frozen, whereas to those in an industry as young as aviation this information should be as fluid and free as possible.

The response was seconded by Mr. Percy Bradley, who stressed the importance of the word "automobile" in the somewhat lengthy title of the college. While a Brooklands firm had, this year, helped to obtain the long-distance air record, almost equally important records had been made in the car world. He spoke also of the origin and history of the college before proposing the toast of "The Guests," to which Mr. Handley Page was asked to reply.

After an initial dig at the Air Ministry and a somewhat two-edged remark about the industry itself, Mr. Handley Page stressed, in his turn, the importance of good aircraft engineering training, and mentioned the committee which had recently been set up by the S.B.A.C. for the purpose of examining the facilities provided at the different factories for the training of apprentices. Three types of trainee had to be provided for—the apprentice, those who were entering the industry from school and wanted four years' practical training coupled with technical instruction, and the university graduate, who also required two or three years in the works. All three required rather different attention, but each had a place in the industry. He praised the way in which the electrical industry had arranged for the training of newcomers. In due course the committee would be producing a carefully considered policy for training.

Finally, Sir Edward Campbell supported Mr. Handley Page in an amusing if somewhat abstruse series of remarks, before the trophies were presented. The Mollison Challenge Trophy, held by the best all-round student of the year, went to Mr. V. A. M. Hunt, and the new Olley Challenge Trophy, held by the senior student in practical engineering on the aeronautical side, went to Mr. A. C. Williams, a New Zealand student.

FROM the CLUBS

(*Continued from page 582*)

THANET

Forty-eight and a half hours were flown during the week, though there was much low cloud and wind, and only two days were suitable for experienced pupils.

WESTON

Twenty-six hours were flown—72 per cent. of available hours during the week. Mr. E. Jenkins made his first solo flight and Mr. A. Garraway obtained his "A" licence.

EXETER

The weather has been gusty and wet with poor visibility, and instruction was held up at times owing to surface water on the aerodrome. Though only 6½ hours were flown, this represents 68 per cent. of available hours for the week. Dr. Margaret Jackson held a very successful sherry party at the airport on Tuesday, December 13.

IPSWICH

Flying times totalled 30 hours, in spite of four days of strong wind. Messrs. T. G. Jefferson and L. Corder made their first solo flights. The Hillson-J.A.P.s are back in operation; they had been found to be slightly underpowered for instructional purposes and, during the summer, the company's engineers redesigned certain components and increased the output by 8 h.p.

ROMFORD

An important event for the Romford Flying Club took place at Maylands aerodrome last Sunday, when nearly 300 members attached to the C.A.G., the Air Defence Cadet Corps and the National Women's Air Reserve under Sqn. Ldr. K. Garston-Jones, of No. 6 Romford Squadron, were inspected and afterwards addressed in the clubhouse by Air Comdre. Chamier, Secretary General of the Air League of the British Empire, and by Lt. Col. S. Mallinson, Deputy Lieutenant of Essex. Col. Mallinson read a message of congratulation from the King, and Air Comdre. Chamier mentioned that the Cadets were to be taught gliding when in camp next year.

Nearly 20 hours' flying instruction was given during the week. Messrs. Burtinshaw and Matthews went solo and Mr. Trappett qualified for his "A" licence.

PLYMOUTH

Thirty hours were flown during a week of poor weather. There has been much excitement over the continuous attempts to relieve Eddystone lighthouse, and 7 hours out of the total were flown on photographic work in this connection.

Speechless

ON an annual principle which might be followed at other functions of a similar kind, there were no speeches, in the usual sense of the word, at the London Aeroplane Club's dinner and dance last Friday.

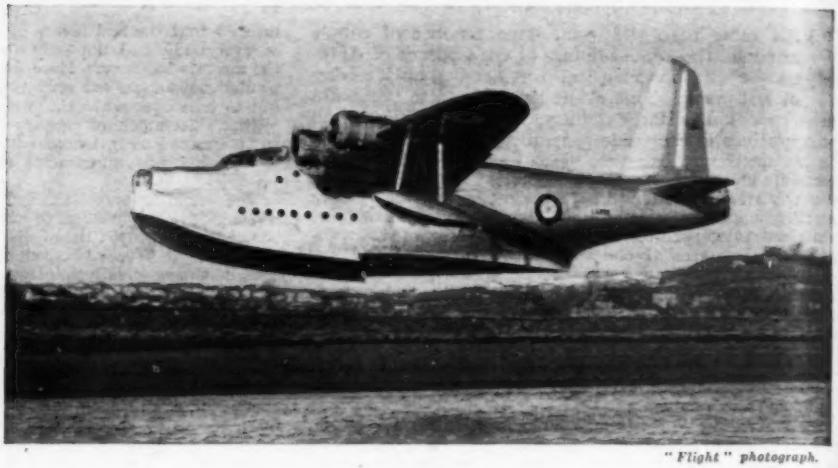
As before, Major K. M. Beaumont, the chairman, offered a brief report (compiled by Mr. E. W. Rodwell, the secretary) of the year's progress, and Lady Shelmerdine, the wife of the Director-General of Civil Aviation, presented the cups—and thereafter members and guests were free to enjoy themselves.

Major Beaumont suggested that, with the C.A.G. flying and the increase in the subsidy, next year should be the most prosperous in the club's history—and as the oldest subsidised club in the country it deserved to be prosperous. There should also be an increase both in the present membership, which amounted to 450, and in the number of hours flown, which, last year, was the significantly useful figure of 4,550. At the same time, the club had a fleet of nine Tiger Moths and three Hornet Moths—with five instructors to help to drive them—so there was little queueing or waiting at Hatfield.

The respective donors and recipients of the cups were as follows: E. Hicks (Navigation), to D. E. Henderson; F. H. Matusch (Map reading), to C. R. A. Grant; P. H. B. Sprosen (Aerobatics), to H. Greenshields; and M. Young (Forced landings), to B. H. Marriage. After their presentation the chief instructor, Flt. Lt. Harris, came up with Mrs. Harris to the top table to receive a wedding present from the members.

SERVICE AVIATION

Royal Air Force and Official Announcements: Fleet Air Arm News: Military Aviation Abroad



FOR PATROL AND BOMBING: A new Short Sunderland flying boat, several of which type have already been delivered to the R.A.F., taking off for a test flight from the Medway.

"*Flight*" photograph.

Cranwell Passing-out Inspection

THE passing-out inspection of Flight Cadets at the Royal Air Force College, Cranwell, was conducted by Air Marshal Sir Arthur Longmore, K.C.B., D.S.O., last Friday.

In his report on the term (September-December), the Commandant (A.V-M. J. E. A. Baldwin, C.B., D.S.O., O.B.E.) said that there were 156 Flight Cadets at present on the strength.

For the past six months the senior term had received advanced instruction designed to give them a working knowledge of the subjects required in Service units. Five weeks of this period were spent at the Armament Training Station at Sutton Bridge. Although the work was greatly hampered by bad weather and the unserviceability of certain ranges for a period, over 1,800 bombs were dropped and more than 68,000 rounds of ammunition were fired.

The average flying hours of the Cadets now passing out were 106 hours solo, 52 hours dual and 22 hours as observers.

Training on twin-engined aircraft had been introduced for the first time, and all Cadets of Term IV had completed an average of 2 hours 50 minutes solo on this type.

During this training period there had been no accidents necessitating admission of Cadets to hospital.

Reporting on educational progress, the Commandant emphasised the great importance to be attached to the cultivation of adequate powers of expression both in speech and in writing. This could only be attained by constant practice and good reading.

In Armament it has been noticed that, whereas the standard of knowledge appeared satisfactory, some cadets who had done well in previous examinations obtained only mediocre results at the Armament Training Camp. It must be realised that the true test of this subject was efficient technique. In order to emphasise this point it had now been decided that only 400 out of the 1,500 marks allotted to Armament would, in future, be awarded upon examination results.

The Commandant concluded his speech by expressing gratitude for the generous gift of Sir Philip Sassoon, who has presented the College with a six-foot terrestrial globe showing physical features in relief. It is one of the only two of its kind in existence.

AWARDS.

His Majesty the King's Medal (highest aggregate of marks in all subjects).—Flt. Cdt. T. Hurst, who thus wins for "B" Squadron the Sir Thomas Berridge Cup.

The Sword of Honour (best all-round Flight Cadet).—Flt. Cdt. Under-Officer H. F. D. Breese.

The Air Ministry Prize (highest marks in Imperial and War Studies).—Flt. Cdt. P. A. Major.

The Air Ministry Prize (highest marks in Aeronautical Engineering).—Flt. Cdt. H. J. R. Dunn.

Abdy Gerrard Fellowes Memorial Prize (highest marks in Mathematics and Science).—Flt. Cdt. T. Hurst.

J. A. Chance Memorial Prize (highest marks in Service subjects).—Flt. Cdt. Sgt. John Royds Armitstead.

The R. M. Groves Memorial Flying Prize (best all-round pilot in senior term).—Flt. Cdt. Basil Hugh Way, who thus wins for "A" Squadron the *Kinkead Memorial Trophy*.

Observer Corps Exercises

THAT the Air Ministry was now devising measures which would increase the amenities of the Observer Corps was announced by Sir Edward T. Campbell, M.P., on the occasion of presentation of badges to No. 19 Group (Bromley).

Huts were being provided for all Observer posts, said Sir Edward, and arrangements were being made for more frequent exercises, in which the Corps would co-operate with R.A.F. defensive fighters by reporting the movements of simulated enemy bombers.

1,500 Air Observers Needed

THE Air Council has decided, as an immediate and temporary measure, to recruit approximately 1,500 air observers direct from civil life during the next six to eight months, in addition to those already entered.

It has, at the same time, been decided to put air observers on an equal footing, both as regards pay and status, with airman pilots.

Applicants for entry as air observers should apply to the Under-Secretary of State (S.7.e), Air Ministry, London, W.C.2. They must be between the ages of 17½ and 25 years and have a standard of education equivalent to that of the School Certificate. They will be attested for four years' regular service and six years on the Reserve. An extension of regular service up to a maximum of seven years will be permitted at Air Ministry discretion.

The preliminary training period will extend for approximately five months. The first three months will be devoted to navigational training at a civil flying school. Following two weeks' routine training at a R.A.F. depot, air observers will undergo a six weeks' course in gunnery and bombing at an Observer School. The air observer's duties at a squadron include navigation, bomb-aiming, aerial photography, general reconnaissance and an adequate knowledge of gunnery and wireless telegraphy.

On completion of preliminary training, air observers will be remustered as acting observer and promoted to the rank of sergeant. This rank will be confirmed at the end of six months' satisfactory service in a squadron and the air observer given a rate of pay of 12s. 6d. a day. Air observers will be given opportunities for training as pilots and of promotion to commissioned rank.

Lockheeds on the Way

IT is reported that, following satisfactory acceptance tests by Sqn. Ldr. J. R. Addams, the first of the 200 Lockheed 14s ordered by the Air Ministry is being flown from Los Angeles to New York for shipment to England within the next fortnight.

Minelaying Aircraft

THE existence of German aircraft equipped for minelaying is revealed by Hector C. Bywater, *Daily Telegraph and Morning Post* naval correspondent, in quoting from the 1939 edition of *Nauticus*, the German Admiralty's official annual.

The mines are dropped into the sea from low altitudes, but certain seaplanes are equipped for sowing mines after they have alighted on the surface.

That aircraft for laying naval mines had been developed by certain foreign navies was known in British Service quarters, but this, it is believed, is the first time they have been publicly mentioned.

Particulars are also given of the torpedoes used by torpedo-carrying aircraft. Two types are in service, one of 16in. and the other of 17.7in. diameter. The former is charged with 330 lb. of T.N.T. and the latter with 396 lb. of the new explosive Novit. Both are dropped into the water from heights between 20ft. and 49ft., the range in both cases being about 2,200 yards at a speed of 45 knots.

Five separate types of aircraft bombs are listed as having been evolved for use at sea. The smallest is a fragmentation bomb, weighing 24½ lb. and designed for use against exposed personnel.

High explosive bombs for attacking unprotected parts of a ship vary in weight from 110 to 1,100 lb. and contain from 44 to 662 lb. of T.N.T. There are also armour-piercing bombs of different weights for penetrating the armour decks of warships; gas and phosphorus bombs of 33 to 55 lb. for use against personnel; and bombs for attacking submarines. The last-named weigh 110 lb. and have delay-action for a depth of 50 ft.

Royal Air Force Gazette

Royal Air Force

General Duties Branch

The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—J. J. J. Page (since transferred to Reserve) (September 1); A. J. Guthrie (October 16).

Flt. Lt. J. Cherrill is granted the acting rank of Squadron Leader (paid) from January 14, 1937, to August 7, 1937, inclusive.

The following Flying Officers are granted the acting rank of Flight Lieutenant on the dates stated:—P. Ruston (May 20); D. C. Torrens (September 1); P. G. Heath (October 16); C. A. Wood, H. T. Sutton (November 14); J. V. Hoggarth, F. A. Marlow (November 16); R. I. Jones (November 17); F. L. Sayers (November 21); E. Graham (November 24).

F/O. R. M. Fenwick-Wilson relinquishes the acting rank of Flight Lieutenant (November 22).

Royal Air Force Reserve

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Flt. Lt. H. N. Hawker is granted a commission in that rank in Class C with effect from December 13 and with seniority of December 21, 1930; Air Comdre. B. C. H. Drew, C.M.G., C.V.O., C.B.E. (R.A.F. Ret.), is granted a commission as Squadron Leader (Honorary Air Commodore) in Class CC (July 25); Maj. G. D. Hill (R.A.R.O.) is granted a commission as Flight Lieutenant (Honorary Squadron Leader) in Class CC (August 17).

The following are granted commissions in Class CC, in the ranks stated, with effect from the dates stated:—

Flight Lieutenants.—Capt. J. F. R. Massy-Westropp, M.B.E., (R.A.R.O.), Flt. Lt. M. V. de Satgé (R.A.F.O.) (May 9); Maj. A. A. Fraser Harris (I.A., Ret.) (May 13); H. S. Martin (June 1); Flt. Lt. G. G. Mobsby (R.A.F., Ret.), Flt. Lt. G. E. Newton (June 20); Flt. Lt. A. G. Jarvis, A.F.C. (R.A.F., Ret.) (July 13); Flt. Lt. F. R. Jones (R.A.F.O.) (July 18); F/O. G. A. Atkinson (July 21); Lt. Col. G. G. Carpenter, D.S.O. (R.A.R.O.) (July 29); Flt. Lt. A. H. Beach (R.A.F., Ret.) (August 4); Flt. Lt. H. R. Lowry (R.A.F.O.) (August 14); Capt. A. Belle (R.A.R.O.) (August 19); Capt. J. H. Harris (I.A. Ret.) (August 25); Maj. H. J. Hasler, M.C. (I.A. Ret.) (August 29); Capt. W. M. Anderson (R.A.R.O.) (September 2); Flt. Lt. L. V. Bennett, M.C. (R.A.F.O.) (September 8); F/O. T. J. Southern (September 12); Flt. Lt. R. L. Bateman (R.A.F.O.), Flt. Lt. A. T. Hall Willis (R.A.F.O.), Flt. Lt. H. J. A. Williams (R.A.F.O.), (September 19); Flt. Lt. F. T. K. Bullmore (R.A.F.O.) (September 20); Flt. Lt. C. K. Turner (R.A.F.O.) (September 24); Flt. Lt. P. J. Bett (R.A.F.O.) (September 26); Lt. Col. W. E. D. Campbell (I.A. Ret.) (September 27); Flt. Lt. H. J. T. Russell (R.A.F.O.) (October 1); Maj. R. D. S. Reid (R.A.R.O.) (October 4); Maj. J. N. Dalzeil (I.A. Ret.) (October 12); Capt. P. E. L. Gethin, A.F.C. (October 13); Maj. M. Bennetts, M.C. (R.A.R.O.) (October 21).

F/O. H. de M. Middleton (R.A.F.O.) is granted a commission in that rank in Class CC with effect from May 13, and is granted the acting rank of Flight Lieutenant with effect from October 1; F/O. (now Flt. Lt.) G. E. E. Singleton (R.A.F.O.) is granted a commission in Class CC as Flying Officer with effect from May 7 and with seniority of April 1, and as Flight Lieutenant with effect from September 19; the Rt. Hon. Lord Dudley is granted a commission as Flight Lieutenant in Class CC (August 18); Flt. Lt. S. H. Bell (R.A.F.O.) is granted a commission in Class CC as Flying Officer (Honorary Flight Lieutenant) with effect from May 7, and with seniority of March 30, and as Flight Lieutenant with effect from September 19; Flt. Lt. S. C. Harker (R.A.F.O.) is granted a commission in Class CC as Flying Officer (Honorary Flight Lieutenant) for the period May 7 to August 29, with seniority of April 7, and as Flight Lieutenant with effect from August 30; F/O. A. H. Grace (R.A.F.O.) is granted a commission in that rank in Class CC with effect from May 7 and with seniority of April 4; F/O. N. H. F. Unwin (R.A.F.O.) is granted a commission in that rank in Class CC with effect from May 23, and is granted the acting rank of Flight Lieutenant with effect from October 1; F/O. R. A. Davies (R.A.F.O.) is granted a commission in Class CC as Flying Officer with the acting rank of Flight Lieutenant (September 19); Flt. Lt. G. S. White is transferred from Class A to Class C (November 24).

The following are transferred from Class C to Class CC (May 7):—Flight Lieutenants.—H. J. Adkins, D. S. Jillings, M.B.E., M.C. (Honorary Squadron Leader) (Squadron Leader, R.A.F. Ret.), D. E. Ward, S. J. Gilbert.

F/O. M. P. Suckling Spencer (Lt. R.A.R.O.) is transferred from Class C to Class CC with effect from May 7 and is granted the rank of Flight Lieutenant with effect from September 3.

Flt. Lt. M. F. Summers relinquishes his commission on completion of service (November 27).

Equipment Branch

Flt. Lt. G. J. Maygothling (R.A.F. Ret.) is granted a commission in that rank in Class C (December 17, 1937); Sec. Lt. N. S. Roupell is granted a commission as Flight Lieutenant in Class C (December 20, 1937); Flt. Lt. H. Cartwright (R.A.F. Ret) is granted a commission as Flight Lieutenant in Class CC (May 19).

Medical Branch

Flt. Lt. C. J. MacQuilan, B.A., M.D., B.Ch., relinquishes his commission on completion of service and is permitted to retain his rank (September 15).

Auxiliary Air Force

General Duties Branch

No. 901 (COUNTY OF LONDON) (BALLOON) SQUADRON.—F/O. W. C. Titheradge is promoted to the rank of Flight Lieutenant (October 28).

No. 902 (COUNTY OF LONDON) (BALLOON) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant on the dates stated:—R. A. Hodgson (October 1); J. G. Hudson (October 4).

No. 903 (COUNTY OF LONDON) (BALLOON) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant (November 8):—N. F. Blackie, L. Kemp.

No. 904 (COUNTY OF SURREY) (BALLOON) SQUADRON.—The following Flying Officers are promoted to the rank of Flight Lieutenant (November 18):—E. D. Shalthouse, W. E. B. Barclay, M.C.

Equipment Branch

No. 600 (CITY OF LONDON) (FIGHTER) SQUADRON.—Flt. Lt. G. J. Maygothling (Flight Lieutenant, R.A.F., Ret.) relinquishes his commission on cessation of duty (December 17, 1937).

Owing to the greatly increased length of these lists, as a result of R.A.F Expansion, ranks are confined to those of Flight Lieutenant and above.

ALVIS LEONIDES TYPE-TESTED

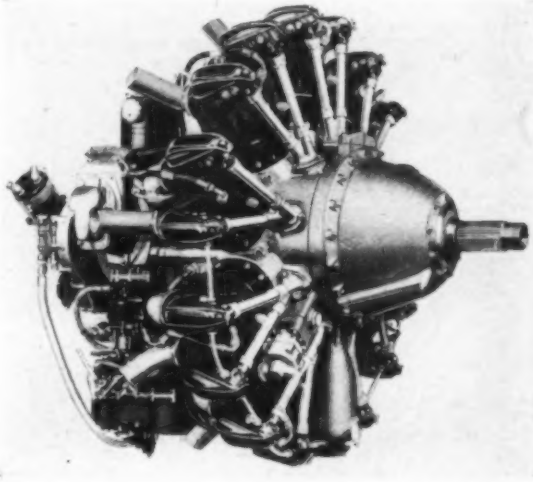
THE Air Ministry has confirmed that the Alvis Leonides nine-cylinder radial has been accepted as airworthy in the Normal Category under Air Navigation Orders and Directions for use in civil aircraft. This unit is a 100 per cent. Alvis design and manufacture, and the makers are to be complimented on the fact that the type test was completed in one day under twelve months from the day on which the first line was put on the drawing board. Flight tests are scheduled to start in a few days, the Air Ministry having loaned an airframe for the purpose. This Civil Type Approval is classified in: (1) The Normal Category sub-divisions (a) to (e); (2) the Special Category sub-divisions (f) to (g); (3) the Acrobatic Category sub-divisions (a) to (g).

The established international power rating is 415/435 h.p. at 3,000 r.p.m. at 8,250ft. and plus 3lb./sq. in. boost pressure; and the maximum power rating is 445 b.h.p. at 3,100 r.p.m. at 8,750ft. and plus 3lb./sq. in. in boost pressure. The maximum take-off power is 430/450 b.h.p. at 3,000 r.p.m. and plus 5lb./sq. in. boost pressure.

Limiting conditions on boost pressure are: Maximum for take-off (3 minutes limit) plus 5lb./sq. in.; maximum for climbing flight, plus 3lb./sq. in.; maximum for all-out level flight, plus 3lb./sq. in.; maximum for cruising (with rich mixture), plus 2lb./sq. in.

Limiting conditions for r.p.m. are: Maximum take-off (3 minutes limit), 3,000; minimum for take-off at maximum take-off boost, 2,440; maximum for climbing flight, 3,000; maximum for all-out level flight (5 minutes limit), 3,100; maximum for cruising (rich mixture), 3,000.

The airscrew reduction gear is 0.5 to 1; the fuel specification D.T.D. 230 (87 octane), and oil specification D.T.D. 109 (mineral).



The Alvis Leonides nine-cylinder engine gives 415/435 h.p. at 3,000 r.p.m. and 8,250ft.

MAKING AIRFLOW VISIBLE

Herr Lippisch Describes the D.F.L. Smoke Tunnel

THE last time an audience saw a smoke tunnel working at a Royal Aeronautical Society meeting was in 1931, when Mr. W. S. Farren demonstrated a small one he had built and was using at Cambridge. Last Thursday Herr Lippisch, of the Deutsche Forschungsanstalt für Segelflug, illustrated the progress that has been made in the meantime. The slow-motion films shown by the lecturer demonstrated in a very convincing fashion, as will be recorded in its proper place in this account of the meeting, that it *is* possible to make two-dimensional flow visible, and to show such flow to quite a large audience. That the smoke tunnel can supplant force and pressure measurements will be claimed by no one, least of all Herr Lippisch; but as an adjunct to the others the smoke tunnel will take its place in modern research.

The D.F.L. smoke tunnel is of orthodox elevation, but is very narrow (about two inches) in plan. Air is sucked in at one end of the tunnel in the usual way, and there is a cone of high convergence (1 : 10) to give the desired speed through the test section of the tunnel. Close-mesh wire netting is used to straighten out the airflow and remove turbulence. This absorbs a good deal of power, but as steady flow is an absolute necessity the extra power is not to be grudged. In any case the power is not extravagant, owing to the very small cross-section of the jet.

After numerous experiments Herr Lippisch came to the conclusion that the smoke had to be blown into the cone through long tubes at the point of greatest velocity-increase. Here the flow was least likely to become turbulent. The effect of the wire nets is to make the air micro-turbulent, thereby avoiding the larger velocity-differences.

The smoke used in the D.F.L. smoke tunnel is produced from decayed wood burnt in a special stove. The smoke is led through a coke filter and is water-cooled, so that particles of dirt and the tar distillates are removed. This cleaning is indispensable, as without it the tubes would soon become clogged.

An interesting feature of the tunnel is the provision of an arrangement for interrupting the flow of smoke periodically. In that way different smoke fronts are formed, and the deformation of these gives an indication of the velocity distribution. This is called "intermittent smoke delivery."

Although it is mainly intended to show two-dimensional flow, Herr Lippisch demonstrated that the narrow smoke tunnel can be used for rendering visible three-dimensional flow. The formation of marginal vortices was demonstrated, although the small depth of the channel prevented the extension of the flow configuration upwards and downwards. The unequal lift distribution on a yawed aerofoil was also demonstrated by the unequal strength of the marginal vortices.

The Films

The films shown by Herr Lippisch, besides being of extraordinary interest, were of great beauty, particularly those in slow motion; and their showing was enthusiastically received by the audience. As several of the discussion speakers remarked, however, it was impossible at one showing of a large number of different examples in succession to take in all the features of the flow; to do this properly would require hours of study of each case separately.

The films were usually run through first at the ordinary rate, which showed how little could be gleaned from such a method. Then they were slowed down to 1/60th of the rate at which they were taken (1,000 per sec.), and, finally, shown with intermittent emission of smoke.

The first film showed flow past a flat plate and a circular cylinder, both stationary and freely rotating about a horizontal axis. Next came a series of aerofoils fitted with various high-lift devices, and lastly a film having a special bearing on flapping flight, showing the flow over an aerofoil oscillating in different ways, or fitted with a hinged flap and a flexible trailing edge

What struck one at the outset was the series of well-defined, closely spaced parallel straight lines given by the smoke in the empty tunnel, indicating the remarkable steadiness and absence of turbulence achieved by Herr Lippisch in his tunnel. With both the vertical flat plate and the circular cylinder it was fascinating to note the (apparently) slow, rhythmical up-and-down movement of the stagnation point in sympathy with the shedding of eddies first on one side and then on the other to form the Kármán street of vortices. The interrupted flow here produced specially beautiful results. With the freely rotating cylinder it was quite clear from the nature of the flow that a lift was being produced. The rotating flat plate also produced some lift, but it was smaller.

The film of the series of aerofoils showed very clearly the time lag before breakdown of the flow occurs when the incidence is suddenly increased. The Handley Page front slot was shown in action, opening and closing, with its usual striking effect of removing the turbulence over the upper surface of the aerofoil.

A slotted aerofoil having a rotating cylinder forming the nose of the main aerofoil gave perhaps the most remarkable result of all. Lift was maintained up to angles of incidence approaching 90 deg. The intermittent smoke delivery showed up the great velocity differences between the upper and lower surfaces due to the strong circulation.

In the cases of sudden operation of front and rear spoilers the lag effect of the former was clearly discernible, while the large extent of the eddy system produced by the comparatively small spoiler was striking. The intermittent delivery was also useful in bringing out the greater retardation behind the downward tip of a yawed aerofoil.

The Discussion

Professor G. T. R. Hill spoke of the importance of a tunnel such as that of Herr Lippisch to the theoretical man. It gave him a "kick-off" in the right direction and enabled him to avoid making unwarranted assumptions. He referred amusingly to the "startling implications" of being able to maintain lift up to nearly 90 deg. incidence and to the revolution in undercarriage and landing technique which would, as a result, be required. He wondered how Herr Lippisch's films were to be recorded in the Journal of the R.Ae.S., and suggested, half in jest, that they should be made up in the form of a booklet, the pages of which one could flick over to give the moving-picture effect. He enquired of Herr Lippisch as to whether he had done anything on scale effect on the nature of the flow.

Dr. Townend's chief point was in connection with the high lift of the oscillating aerofoil; he thought this opened up some very interesting possibilities. High lift might be secured by suddenly increasing incidence and reducing it "before the flow had time to change its mind."

Mr. Manning was specially interested in the results as bearing on flapping flight. He referred to the very large vortices behind the oscillating aerofoil with flexible trailing edge and said he thought this must mean a great loss of energy with consequent inefficiency.

Mr. Shenstone referred to Herr Lippisch's early days when, not having a smoke tunnel, he had to wait for a day in which there was a high wind and a snowstorm in order to see the behaviour of the airflow. He also was struck by the large "hole" in the air made by the flapping aerofoil, and also by the spoiler eddies of some two or three times the height of the spoiler.

Herr Kronfeld said he had been privileged to work under Herr Lippisch and paid tribute to his capacity not only as a scientific thinker, but also as a man of practical engineering ability. In connection with the Kármán street he said he noticed that it got wider as one progressed downstream and wondered if this fact could be connected with gliding height records.

Professor B. M. Jones, in winding up the discussion, said he had noticed that with the flapping wings the more regular flow was produced by the flexible wing. He wondered if Herr Lippisch had done anything towards connecting up the flow pictures with the actual variations of lift and drag in the two cases. Herr Lippisch's smoke tunnel, he thought, represented a definite advance in experimental technique which had been neglected in the past. Further, the tunnel might give clues to approximations one might make in calculations.

Professor Jones said scientists were often blamed for devising means of destruction in the world; on the other hand it was the scientists of the world who were getting together and so establishing those closer relationships which might well lead to the avoidance of wars. In conclusion, he moved a vote of thanks to Herr Lippisch which was passed with great cordiality.

Herr Lippisch said he would prefer to reply to the discussion mainly in writing, owing to his lack of fluency in the English language. The question of scale effect was chiefly one of the time and money required to build a larger tunnel. In coming as a guest to this country he was pleased to contribute such scientific "gifts" as lay in his power.

THE ROYAL AERO CLUB

Official News and Notices for *Week Ended December 17*

New C.A.G. Insurance Move

AN unexpected move has occurred this week in the negotiations for the insurance of C.A.G. flying. As a sequel to the report of the Executive Committee of the General Council of Associated Light Aeroplane Clubs that nothing further could be done to secure a modification of the insurance terms, numerous clubs have now proposed a joint self-insurance scheme and a complete breakaway from all existing aviation insurance interests.

All clubs have been asked to send in their views on this matter to the General Council.

Aerodromes Flooded Out

MANY aerodromes in England and France were reported during the week as temporarily unserviceable owing to heavy rains The names of these aerodromes were broadcast during the week, and private owners and club flyers about to undertake a tour should enquire at the Customs aerodrome through which they pass as to the state of the ground at any of the aerodromes in their itinerary.

More Prohibited Areas

FURTHER increases in the number of prohibited areas are recorded this week. One of the largest alterations is in *Finland*, and a Swedish Notice to Airmen gives full particulars.

Roughly, the largest area concerned extends along the whole of the Finland-U.S.S.R. frontier, and there are several smaller prohibited areas along the islands of the south coast.

Flights may not be made over these areas unless prior permission has been obtained from the Finnish military authorities.

In *Hungary*, the whole of the part of Czecho-Slovakia recently ceded to Hungary has been prescribed unless special permission has been obtained from the Royal Hungarian Air Office.

New Route Book.—A book amplifying the information given on A.A. and R.Ae.C air route maps has been issued. It enables pilots who wish to fly between London and Cairo to select the route best suited to their requirements and gives much additional information.

This is the first book of the type of be issued and it is available to holders of the R.Ae.C. and A.A. Air Touring Cards.

European Air News

GERMANY.—Until March 31, 1939, blind-landing exercises will be in progress in an area bounded by Duben-Tauchа-Groitsch-Freyburg-Raguhn-Duben, which is approximately within 23 miles radius of Halle Leipzig Schkeuditz Aerodrome. Aircraft, except when operating in scheduled services, may fly over this area only in good visibility, but a height over 1,100 metres (3,609ft.) above sea level must be maintained in blind flight.

Pending the opening of a public airport in the Sudeten areas, the landing of civil aircraft in these areas is prohibited unless special permission has been obtained.

Hungary.—The temporary prohibited area of 20 km. radius from Budapest has been abolished. In addition, the ban on flying within the temporary prohibited area of Bánhida-Vác-Szolnok-Dunaföldvár has been removed.

Poland.—Warsaw-Mokotow: Airmen landing or taking off from Warsaw-Mokotow aerodrome should watch for the newly erected high lamp-posts on a new road on the east side of the aerodrome.

Warsaw-Okecie: Instrument-flying experimental flights are being carried out on this aerodrome by aeroplanes with tail surfaces painted white

Turkey.—Aircraft duly authorised to fly over the Turkish territory will no longer be required to have their wireless apparatus sealed at the aerodrome of entry.

AVIATORS' CERTIFICATES

No.	Name.	School or Club.	Date.
16,639	John Tudor Jones	Liverpool & District	22.11.38
16,640	John Robert Jamieson	North Staffs.	8.11.38
16,641	Philip Clayton Sawyer	North Staffs.	29.10.38
16,642	Harold Mylechreest Rowell	Airwork Flying Club	26.11.38
16,643	Frederick Arthur Parkinson	Bournemouth	19.11.38
16,644	Cornelis Johannes Van Hulzen	London Air Park	30.11.38
16,645	Ian Laurence Carr	Brooklands	22.11.38
16,646	Francis Philip Whaley	Brooklands	24.11.38
16,647	George William Cecil Hardi ng	Plymouth & District	26.11.38
16,648	Lucia Davidova	London	12.11.38
16,649	Renney William Stanway	Brooklands	1.12.38
16,650	Geoffrey Cleeve Mills	Hampshire	1.12.38
16,651	Malcolm Gray	York & Leeming	1.12.38
16,652	Alan Reginald Jameson	Redhill	20.11.38
16,653	Edward Clement Blower	Witney & Oxford	20.11.38
16,654	Ronald Leslie Balfour-Melville	Edinburgh	28.11.38
16,655	Andrew Guthrie Hunter	Edinburgh	27.11.38
16,656	Percy Ernest Adams	London Air Park	30.11.38
16,657	Edmund Sydney Harries	Brooklands	24.11.38
16,658	Leigh La Vars Tose	Brooklands	13.11.38
16,659	Joyce Constance Sinclair Buist	Witney & Oxford	29.11.38
16,660	Richard Domville Poland	Doncaster	7.11.38
16,661	Maurice James Joseph Hanrahan	No. 10 E.R.F.T.S. (Yatesbury).	2.12.38
16,662	Charles Harry Saville	Grimsby	3.12.38
16,663	Leslie Thornton	Southend	1.12.38
16,664	Ronald Henry Thomas	Southend	28.11.38
16,665	Hector Macdonald Pearman	Redhill	3.12.38
16,666	Eric Bowman Terry	Northern F.S. & Club	9.11.38
16,667	Noel Fletcher	Northern F.S. & Club	22.11.38
16,668	Alfred William Wilson	Northern F.S. & Club	2.12.38
16,669	Joan Margaret Greenham	Norfolk & Norwich	2.12.38
16,670	George Walter Baker	Reading	28.11.38
16,671	Joseph Ernest Marshall	Bedford	3.12.38
16,672	Edward Dixon Crew	Bedford	3.12.38
16,673	Robert Ian Sworder	Bedford	3.12.38
16,674	Stanley William Ashton	Wiltshire	30.11.38
16,675	Charles George Wanhill	Portsmouth	3.12.38
16,676	Hugh Dymant Morgan	Portsmouth	3.12.38
16,677	Kenneth Greer Hopwood	Grimsby	4.12.38
16,678	Edward Sydney Arnold	Malling	4.12.38
16,679	Cyril Aubrey Patrick Clover	Yapton	29.11.38
16,680	Victor Harold Stephens	London Air Park	3.12.38
16,681	Frederick Ernest Flint	London Air Park	3.12.38
16,682	John Buchanan Russell	Northern Aviation School & Club	6.12.38
16,683	Edwin Arthur John Wyatt	Hampshire	6.12.38

Coupe Zenith Performance

IN the annual Coupe Zenith competition, which was held on Saturday, December 3, Paul Lemée covered the Orly-Marseilles course, flying a Pobjoy-engined Comper Swift, in 6 hr. 53 min. 56 sec.—giving an average speed of 182 km./hr. (113 m.p.h.). Not too bad for a single-seater light aeroplane designed something like a decade ago.

Forthcoming Events

JANUARY, 1939.

Sun., 1st. Bedford School of Flying: New Year Party.

Wed. 4th. R.U.S.I. Lecture: "Psychological Effects of Bombing," by Dr. F. B. Strauss, M.A., D.M. (Oxon.), M.R.C.P. Royal United Service Institution, Whitehall, 5 p.m.

Tues., 10th. R.Ae.S. Isle of Wight Branch Lecture: "Recent Research on Seaplanes," by H. Mason Garner, M.A., F.R.Ae.S.

Thurs., 12th. R.Ae.S. Yeovil Branch Lecture: "Retractable Undercarriages," by R. H. Bound.

Thurs., 12th. R.Ae.S. Portsmouth Branch Lecture: "Recent Progress in German Aircraft," by B. S. Shenstone, A.F.R.Ae.S.

Fri., 13th Coventry R.A.F.V.R. Annual Supper Dance, Drill Hall, Coventry.

FEBRUARY.

Wed.—Fri., 1st—3rd. Aerodrome Owners Association: Airports Conference and Exhibition.

Fri., 24th. York and Leeming Flying Club: Annual Ball Harrogate.

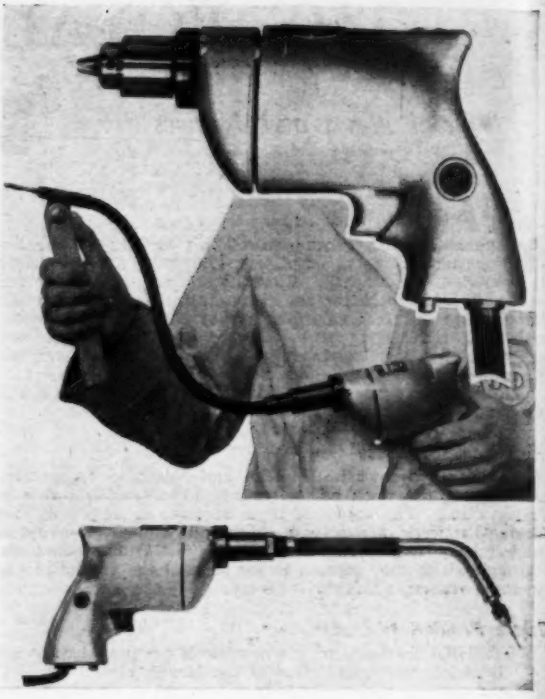
THE INDUSTRY

Close-Corner Drilling

THE aircraft constructor is faced with many problems when dealing with close-corner drilling. The spindle offset of the average portable drill precludes its use for a number of production jobs. With this in mind, Black and Decker, Ltd., of Slough, have evolved a new, compact portable electric drill with some unusual features. Known as the Holgun, this tool has a pistol-type grip with a two-pole automatic trigger release switch and a locking pin in the butt end of the grip to secure the switch in the "on" position. The drill is well balanced and "handy" in operation. A steel fan and three screened air inlets, together with outlet slots, ensure cool running of the powerful Universal electric motor.

But the most important feature of the Holgun is that the spindle offset is only $\frac{1}{2}$in., while the overall length is only $6\frac{3}{4}$in. Where even closer work is required a special flexible drive can be fitted, thereby reducing the offset drive to a mere $\frac{3}{16}$in. This drive replaces the chuck. Another interesting accessory is a sturdy angle drive, with a chuck set at an angle of 30 deg. from the axis of the spindle.

In spite of its small dimensions the Holgun has a speed and torque equivalent to (and in some cases even greater than) many of its heavier and larger predecessors of the same capacity. It is specifically designed for heavy-duty work with drills up to $\frac{1}{4}$in.



An exceptionally low minimum offset of the spindle enables the new Black and Decker Holgun (described in the adjacent column) to be used for real close-corner drilling. It can be supplied with a special flexible drive giving an offset of $\frac{3}{16}$in. and with an angle drive, the chuck of which is set at 30 degrees from the axis of the spindle.

Brooklands Staff Dines

CAPT. H. DUNCAN DAVIS, in thanking the "blokes who keep the fans going round" at the staff dinner of Brooklands Aviation, Ltd., and the Brooklands Flying Club, Ltd., at the Ace of Spades (on the Kingston By-pass), said that the year's biggest disaster had been a broken undercarriage. He reminisced (to the obvious delight of some of the "new faces") on the trials of the old days, *circa* 1928, when three Renault-Avros composed the Brooklands fleet. Extracts from what were alleged to be lately discovered notes gave an insight into the life of a managing director.

Mr. Ken Waller, chief instructor, proposed the toast of directors and guests, and Mr. D. Watson that of Brooklands Aviation, Ltd., and the Brooklands Flying Club, Ltd. Under persuasion, Mr. "Bill" Massey said a few characteristic words of thanks.

So far as can be ascertained at present, between 4,700 and 5,000 flying hours were recorded during 1938.

Westland Progress Reviewed

AT the general meeting of Westland Aircraft, Ltd., held in London last week, Lord Aberconway (the chairman) and Mr. Alan P. Good (the former chairman) reviewed in detail the recent changes by which the company passes to the control of John Brown and Co., Ltd.

It was also stated that the net profit showed an increase of nearly 50 per cent. It was recommended (and subsequently affirmed) that this profit should be utilised in carrying to taxation reserve £13,000, as against £7,500 last year; in paying a dividend at the rate of 8 per cent., as against 5 per cent. last year; and by a transfer of £10,000 to create a general reserve, the balance carried forward being some £30 more than the balance brought in.

Mr. Good said that they were now in steady production with the Lysander, and that it was likely to continue for some time.

Avro Extensions: Air Ministry Intervention

WHEN A. V. Roe and Co., Ltd., proposed to erect aircraft assembly sheds and additional offices at Woodford Aerodrome, Cheshire, on land already prepared by the contractors (Sir Lindsay Parkinson, Ltd.) the Town Planning Committee of Macclesfield Rural District Council refused to pass the plans for the extensions. Woodford Parish Council likewise opposed the plans on the ground that the works would not be of benefit, as there were no local unemployed. The R.D.C. turned down the plans, as the area is scheduled for high-class residential property.

A. V. Roe pressed that the plans be approved on the score of national emergency, and stated that the works when completed would provide employment for 2,000 men. At the same time, they appealed to the Ministry of Health to hold a public inquiry. This inquiry was fixed for December 13.

Then, within a few hours, the Air Ministry intervened, overruling objections of the R.D.C. The inquiry was cancelled, and work is now proceeding on the Woodford extensions.

Publisher's Announcement

THE Christmas holiday makes it necessary for small advertisements intended for *Flight* of December 29 to be in our hands not later than first post to-morrow, Friday, December 23.

AERONAUTICAL PATENT SPECIFICATIONS

(The numbers in brackets are those under which the Specifications will be printed and abridged, etc.)

(*Published December* 8, 1938.)

6806. ALDERSON, H. J., and MILL, T. G.: Means for measuring or indicating the thrust of an aircraft propeller (495,309).

9554. BOULTON PAUL AIRCRAFT, LTD., and NORTH, J. D.: Means for supplying ammunition to guns in aircraft gun turrets (495,187).

13317. ANDREWS, W. R., ILETT, S. C., and SCOTTISH AIRCRAFT AND ENGINEERING CO., LTD. (in Liquidation): Bomb-carrying and release mechanism for aircraft (495,329).

13418. BRISTOL AEROPLANE CO., LTD., FEDDEN, A. H. R., and CLINCH, A. C.: Control of aircraft engines driving variable-pitch airscrews (495,444).

16405. MOSS, D. G. K., and PEIRCE, H. C.: Directional gyroscopes (495,431).

27263. DAIMLER-BENZ AKT.-GES., and STOECKICHT, W.: Starting of internal-combustion engines (495,346).

30471. UNITED AIRCRAFT PRODUCTS, INC.: Lubricant conditioning system, particularly for internal-combustion engines (495,233).

5395. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Arrangements for damping rotational oscillations in shafts (495,278).

15884. JUNKERS FLUGZEUG-UND-MOTORENWERKE AKT.-GES.: Apparatus for the production of curved, elongated profiled sheet-metal members of channel cross-section (495,302).

20795. VOKES, C. G.: Installation of air filters in aircraft (495,369).

21163. FOCKE, H.: Rotating-wing aircraft with side-by-side rotors (495,176).

(*Published December* 15, 1938).

4872. AIR EQUIPMENT: Operating mechanism for retractable members on board aircraft (495,759).

10644. BULLOCH, D. C.: Prevention of ice formation on the wings and other parts of aircraft (495,570).

13946. ECLIPSE AVIATION CORPORATION: Engine-starting mechanism (495,787).

14157. VICKERS (AVIATION) LTD., and ELLIS, D. L.: Airscrews (495,838).

14315. ARENS CONTROLS, LTD., and FAULKNER, R.: Flexible power-transmission devices (495,722).

19679. BRISTOL AEROPLANE CO., LTD., FEDDEN, A. H. R., ANDERSON, G. O., and BARR, A. W.: Supercharged internal-combustion engines (495,497).

6424. BERRY, R. J. (Lorenz Akt.-Ges., C.): Methods of indicating distance by wireless (495,612).

9753. NAPIER AND SON, LTD., D., and RAMSAY, F. R. F.: Means for testing the electrical ignition systems of internal combustion engines (495,547).

11218. LORENZ AKT.-GES., C.: Antenna arrangements, especially for radio beacons (495,624).

11247. VOLTERRA, E.: Ferro-concrete coverings or roofings for large buildings such as aeroplane hangars (495,625).

15101. BERRY, R. J. (Lorenz Akt.-Ges., C.): Receiving arrangements for radio direction-finder systems (495,554).

21896. BULLOCH, D. C.: Prevention of ice formation on the wings and other parts of aircraft (495,935).